QAD Enterprise Applications
Standard and Enterprise Edition

Training Guide

Master Scheduling and RCCP

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Contents

Master Scheduling and RCCP Change Summary

The following table summarizes significant differences between this document and the last published version.

Date/Version	Description	Reference
March 2014/v2014 SE_EE	Rebranded for QAD 2014 SE_EE	--
September 2013/v2013.1 SE_EE	Rebranded for QAD 2013.1 SE_EE	--
March 2013/v2013 SE_EE	Rebranded for QAD 2013 SE_EE	--
September 2012/v2012.1 SE_EE	Rebranded for QAD 2012.1 SE_EE; Consistency edit	--
March 2012/v2012 SE_EE	Rebranded for QAD 2012 SE_EE	--
September 2011/v2011.1 SE_EE	Rebranded for QAD 2011.1 SE_EE	--

About This Course

Course Description

QAD designed this course to cover the basics of preparing to implement Master Scheduling and Rough-Cut Capacity Planning (RCCP) in QAD Enterprise Applications. The course includes:

- An introduction to Master Scheduling and RCCP
- An overview of key business considerations
- Setting up Master Scheduling and RCCP
- Using Master Scheduling and RCCP
- Activities and exercises throughout the course that let students practice key concepts and processes in Master Scheduling and RCCP

Course Objectives

By the end of this class, students will:

- Analyze some key business issues before setting up Master Scheduling and RCCP
- Set up and use Master Scheduling and RCCP

Audience

- Materials managers and analysts
- Planners, schedulers, and master schedulers
- Implementation consultants, members of implementation teams, and key users

Prerequisites

- Recommended training courses:
  - *Initial QAD Enterprise Applications Setup*
  - *Product Structures and Formulas*
  - *Work Orders*
  - *Work Centers, Routings, and WO Subcontracting*
  - *Forecast Simulation*
- General knowledge of the manufacturing industry
- Working knowledge of QAD Enterprise Applications as it is used in the business

Course Credit and Scheduling

This course is designed to be taught in one day.

Virtual Environment Information

This guide applies to both the Standard Edition and the Enterprise Edition of QAD Enterprise Applications. Use the hands-on exercises in this book with the latest Enterprise Edition learning environment in the 10USA > 10USACO workspace. When prompted to log in, specify *demo* for user ID and *qad* for password.

Note Users of Standard Edition should complete the exercises in the EE environment; the concepts are the same in both environments and can be applied to Standard Edition. Features that only apply to Enterprise Edition are noted in the text.

Additional Resources

If you encounter questions on QAD software that are not addressed in this book, several resources are available. The QAD corporate Web site provides product and company overviews. From the main site, you can access the QAD Learning or Support site and the QAD Document Library. Access to some portions of these sites depends on having a registered account.

http://www.qad.com/

QAD Learning Center

To view available training courses, locations, and materials, use the QAD Learning Center. Choose Education under the Services tab to access this resource. In the Learning Center, you can reserve a learning environment if you want to perform self-study and follow a training guide on your own.

QAD Document Library

To access release notes, user guides, training guides, and installation and conversion guides by product and release, visit the QAD Document Library. Choose Document Library under the Support tab. In the QAD Document Library, you can view HTML pages online, print specific pages, or download a PDF of an entire book.

To find a resource, you can use the navigation tree on the left or use a powerful cross-document search, which finds all documents with your search terms and lets you refine the search by book type, product suite or module, and date published.

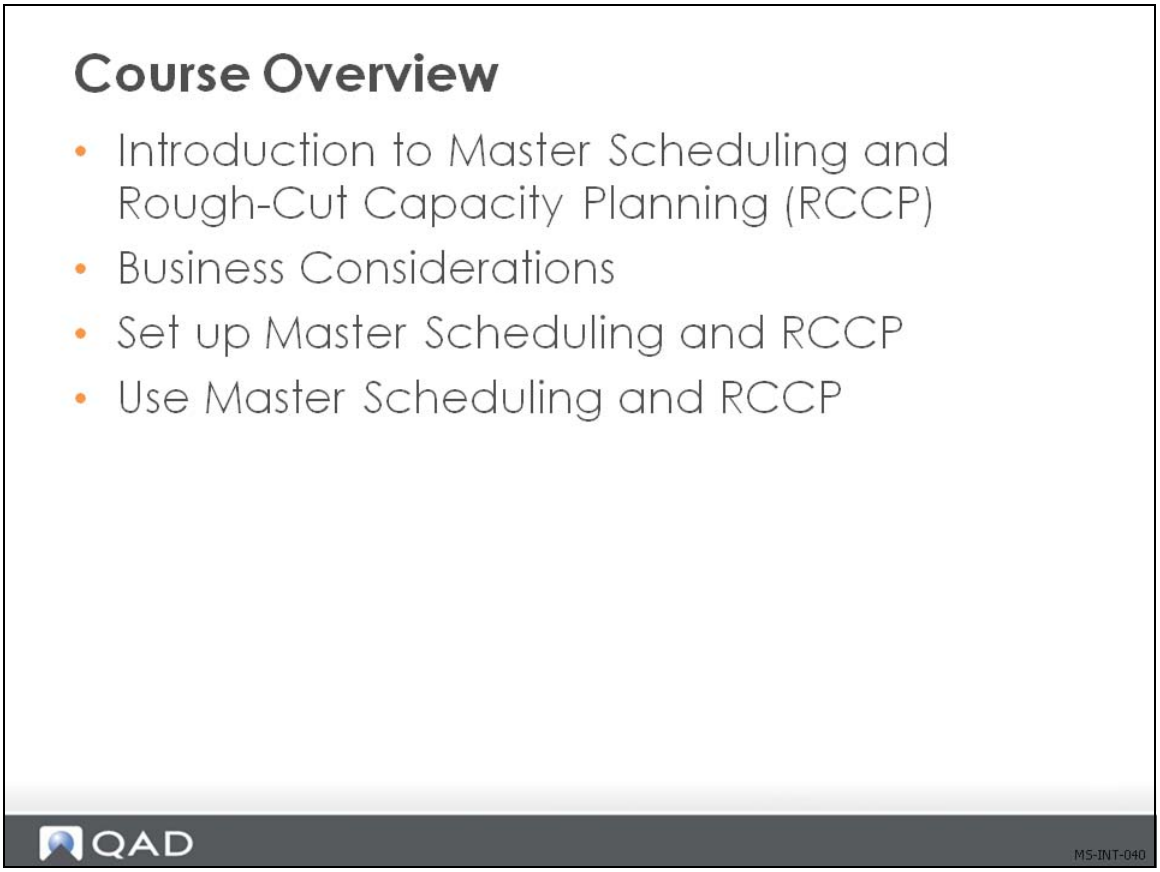
QAD Support

Support also offers an array of tools depending on your company’s maintenance agreement with QAD. These include the Knowledgebase and QAD Forums, where you can post questions and search for topics of interest. To access these, choose Visit Online Support Center under the Support tab.

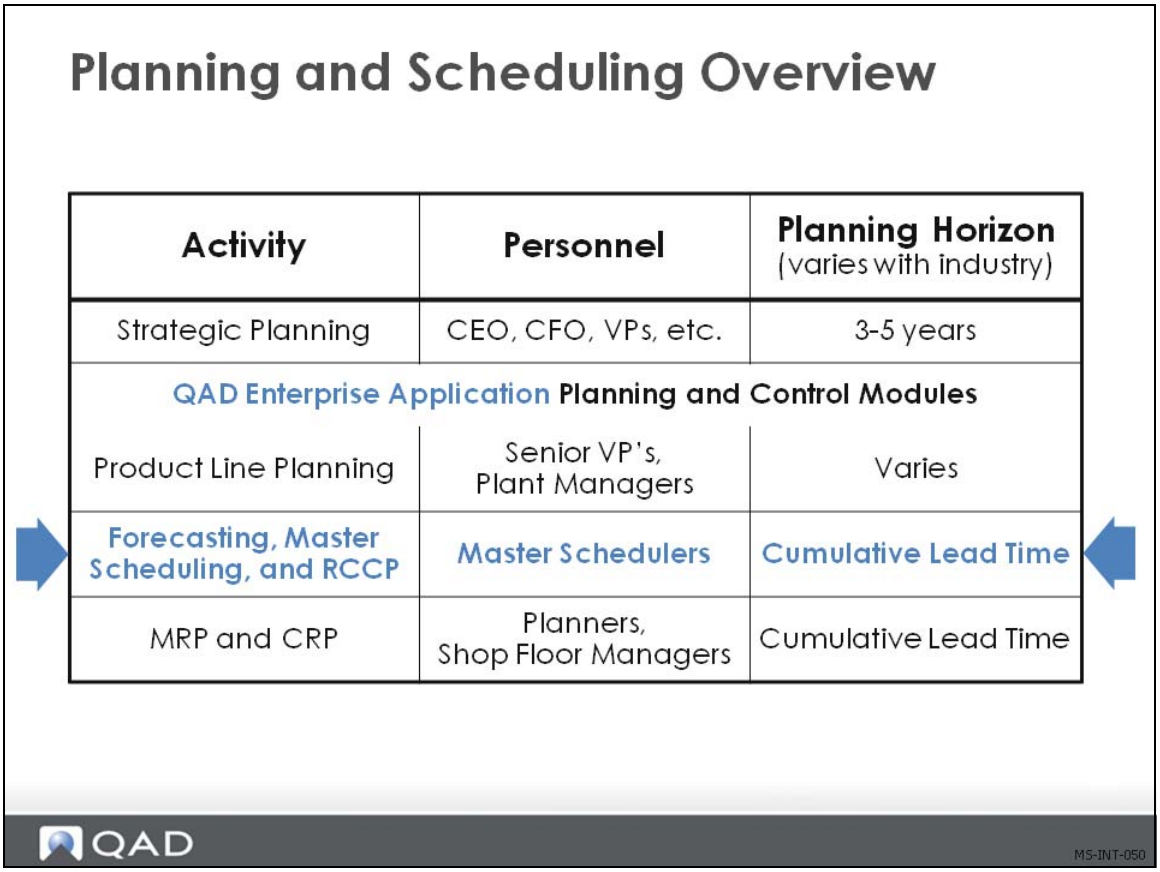
Chapter 1

Introduction to Master Scheduling and RCCP

Course Overview



Planning and Scheduling Overview



All plans set expectations about how resources are used and provide reality checks to determine if plans can be implemented. Planning is done by different people at many levels throughout a corporation and QAD Enterprise Applications provides an integrated toolset that is useful at most of these levels.

Note Students unfamiliar with the planning process described by the American Production and Inventory Control Society (APICS) may find it useful to look at planning level integration.

Strategic Planning

Strategic plans set guidelines for production and sales. Because they are done for the longest term, they are the least integrated and least precise of the planning levels. Chief Executive Officers and Chief Financial Officers look beyond the immediate year's demands to set expectations for growth. Strategic plans set out the overall mission, goals, and initiatives for an organization, largely in terms of gross sales or overall income.

Planning Levels Supported by QAD Enterprise Applications

The following planning levels are supported by QAD Enterprise Applications.

Product Line and Resource Planning

Production planning is done in the Product Line Planning module of QAD Enterprise Applications. The check against resources is done in the Resource Planning module.

This tool enables you to:

- Balance sales forecasts, production forecasts, and income forecasts for an entire product line
- Determine whether you have enough resources, in aggregate, to meet the plans

The production plan sets expectations for a:

- Factory
- Site
- Division
- Department

Sales forecasts, production forecasts, and income expectations are produced by different people. Various sets of expectations must be balanced to determine the plan's feasibility.

Production plans:

- Define manufacturing output and other activities to satisfy current planned levels of sales
- Incorporate and coordinate all activities
- Provide guidance for producing individual items that make up the product line
- Support the corporate objectives of increasing:
  - Net profit
  - Return on investment (ROI)
  - Cash flow

Product line plans are broken up into end items, planned in the master schedule, and exploded to component plans by MRP.

End-Item Planning

End-item planning is done in the Forecast/Master Plan module of QAD Enterprise Applications. This tool enables you to set production levels in response to actual and forecast demand over a period roughly equivalent to the cumulative lead time.

The cumulative lead time is the longest length of time it takes to produce and ship an item, assuming that nothing is in stock or production.

At this stage, you can develop a rough-cut capacity plan to determine if critical resources will be available. For example, if you want to make 50 items next week but your fabricator only makes 25 in a week, you cannot meet the plan.

The end-item plan sets the number of priority items (end items, level 1 items, service parts, and so forth) that are going to be produced and sets the schedule to produce them.

End-item plans are usually done by master schedulers who:

- Estimate demand for a product
- Determine how many items to produce

Master schedulers modify factory plans to accommodate current situations. The horizon tends to be at least as long as the cumulative lead time.

Component Planning

Component planning is done in the Material Requirements Plan (MRP) module and the plans are checked against capacity in the Capacity Requirements Plan module of QAD Enterprise Applications.

This tool enables you to schedule and issue orders for the items and work that will be needed to support the master schedule. You can use Capacity Requirements Planning (CRP) to determine at a fairly precise level how this plan will load the resources you have at your site.

Component planning enables you to determine which work centers and components will be used to meet the plan. The check is to determine whether the work centers have capacity to meet the schedule.

Items that are not master scheduled will be planned using MRP with the master schedule as input. MRP uses this demand to schedule orders for components.

Planners and shop floor personnel use MRP results to determine manufacturing schedules that have the same time horizon as master schedules.

Enterprise Resource Planning (ERP)

In companies that use Enterprise Resource Planning (ERP), operations planning is the key link between long-term business planning and medium- to short-term planning and execution activities.

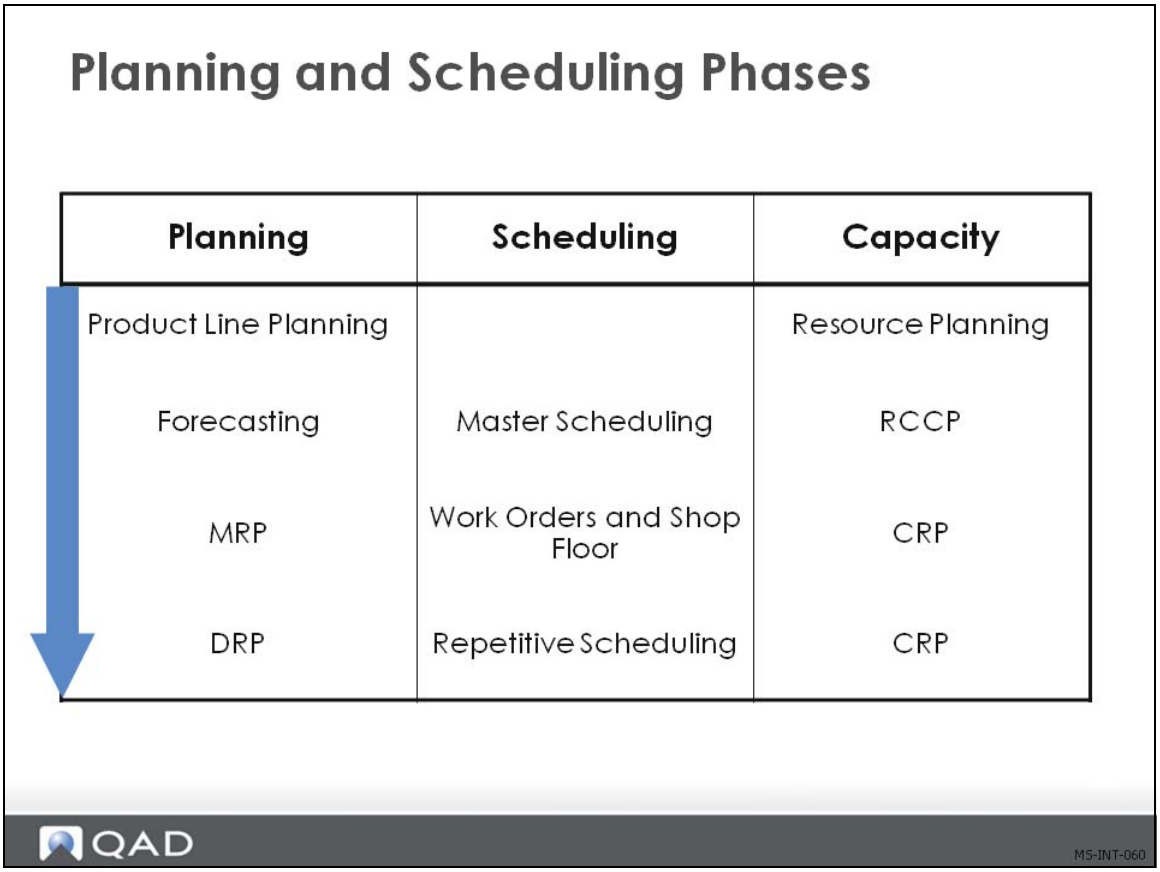
ERP calculates target inventory levels that support company objectives for:

- Profitability
- Inventory reduction
- Lead time reduction
- Customer service

ERP also calculates corresponding production demands. These demands eventually pass into:

- Production
- Purchasing
- MRP

Planning and Scheduling Phases



Planning and execution generally move down and to the right through the matrix shown above.

The Product Line

Product line plans generally cover 1 to 3 years, usually shown by months and quarters. They are composed of aggregate forecasts that are converted into end-item forecasts. These detailed forecasts provide input that the master scheduler uses to create a statement of production.

The purpose of a product line plan is to:

- Aggregate forecasts
- Establish aggregate production goals (aligned to corporate goals)
- Plan efficient and cost effective use of production resources, such as machines and manpower
- Outline the level of planned manufacturing output
- Convert demand into a master schedule and rough-cut capacity plan
- Balance sales forecasts, production forecasts, and income forecasts for an entire product line
- Determine whether there are enough resources, in aggregate, to meet the plan

Product line plans are broken into:

- End items planned in the master schedule
- Component plans by MRP

The Forecast

Forecasting and sales orders introduce independent demand into QAD Enterprise Applications.

Independent demand is demand for an item that is unrelated to demand for other items. These demands serve as the primary reason for establishing the master schedule in QAD Enterprise Applications.

- Forecasts
  - Estimate future demand for an item
  - Are typically a sales function
  - Can be an integral part of master scheduling
  - Represent one point of input to the master schedule
- Source of independent demand can be created for any item, but is usually created for:
  - End items
  - Critical subassemblies
  - Service parts

The Master Schedule

Developed by site and item, a master schedule is the key plan that provides primary input to MRP. A master schedule is a statement of production determining:

- Which items to schedule
- When orders are needed
- How much to produce

Master scheduling can be done to:

- Anticipate sales as entered in QAD Enterprise Applications
- Control production when no sales orders are used in inventory replenishment or build-to-stock environments for example

Using master scheduling and MRP is an effective method to:

- Set production levels in response to actual and forecast demand over a period roughly equivalent to the cumulative lead time
- Determine in a rough way (RCCP) whether critical resources will constrain supply

Qualifications and Responsibilities of a Master Scheduler

A master scheduler must have:

- Expertise in manufacturing
- Comprehensive product knowledge
- General business insight
- The ability to:
  - Reduce lead time to bring new products to market
  - Sell ideas and negotiate compromises

- Resolve conflict
- Minimize impact of changing requirements
- Meet customer goals

A master scheduler must know how to prepare data quickly and verify its accuracy in order to deal effectively with:

- Management (overall goals)
- Marketing and sales (available-to-promise)
- Engineering (changing bills of materials)
- Finance (cash flow)
- Distribution (scheduling)
- Customers (demands)
- Vendors (reliability)

The master scheduler is responsible for providing:

- Manpower
- Materials
- Manufacturing capability
- Money (cash flow)
- Management of all logistical activities

Material Requirements Planning (MRP)

MRP is a time-phased priority planning system that calculates material requirements using:

- Product structures
- Inventory status
- The master schedule
- Open order dates

Supply is scheduled and rescheduled to:

- Meet changing demand
- Maintain valid due dates

Capacity Requirements Planning (CRP)

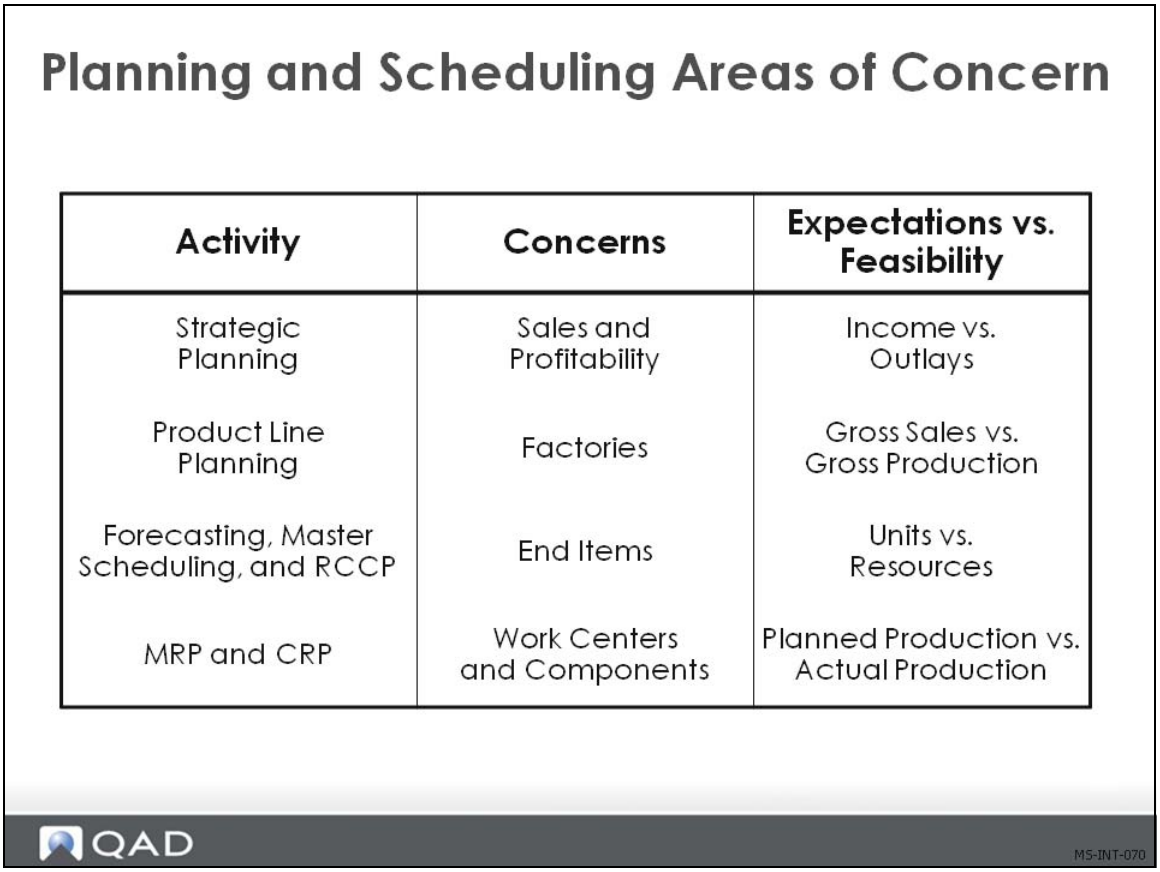
- Determines how much labor and how many machine resources are required for production
  - Calculates workload for a department, work center, or machine
- Used for medium-range capacity management to:
  - Determine and provide the resources required to meet MRP’s detailed item schedules

Distribution Requirements Planning (DRP)

- Balances supply and demand for items transferred between sites. It is done by:
  - Calculating item requirements
  - Creating planned orders
  - Managing shipment schedules and transportation

DRP is the extension of distribution requirements, inclusive planning of key resources contained in a distribution system, such as warehouse space, workforce, money, trucks, and freight cars.

Planning and Scheduling Areas of Concern



Master Schedule

The objective of the master schedule is to:

- Enable implementation of the production plan
- Manage demand and resources
  - Keep priorities in line
  - Plan resources and capacity requirements
  - Ensure good communication between marketing and manufacturing
- Minimize inventory and maximize resource usage

Rough-Cut Capacity Planning (RCCP)

RCCP provides an early warning for schedule problems:

- Provides mid- to long-range capacity planning
- Identifies key material shortages
- Determines labor shortages for critical skills
- Validates the production plan and assists in developing a valid master schedule
- Helps stabilize MRP

- Checks capacity at *critical* work centers, not at each work center
  - A work center is a specific production area with one or more resources with identical capabilities. It can be considered as one unit for CRP and detailed scheduling

RCCP Compared to CRP

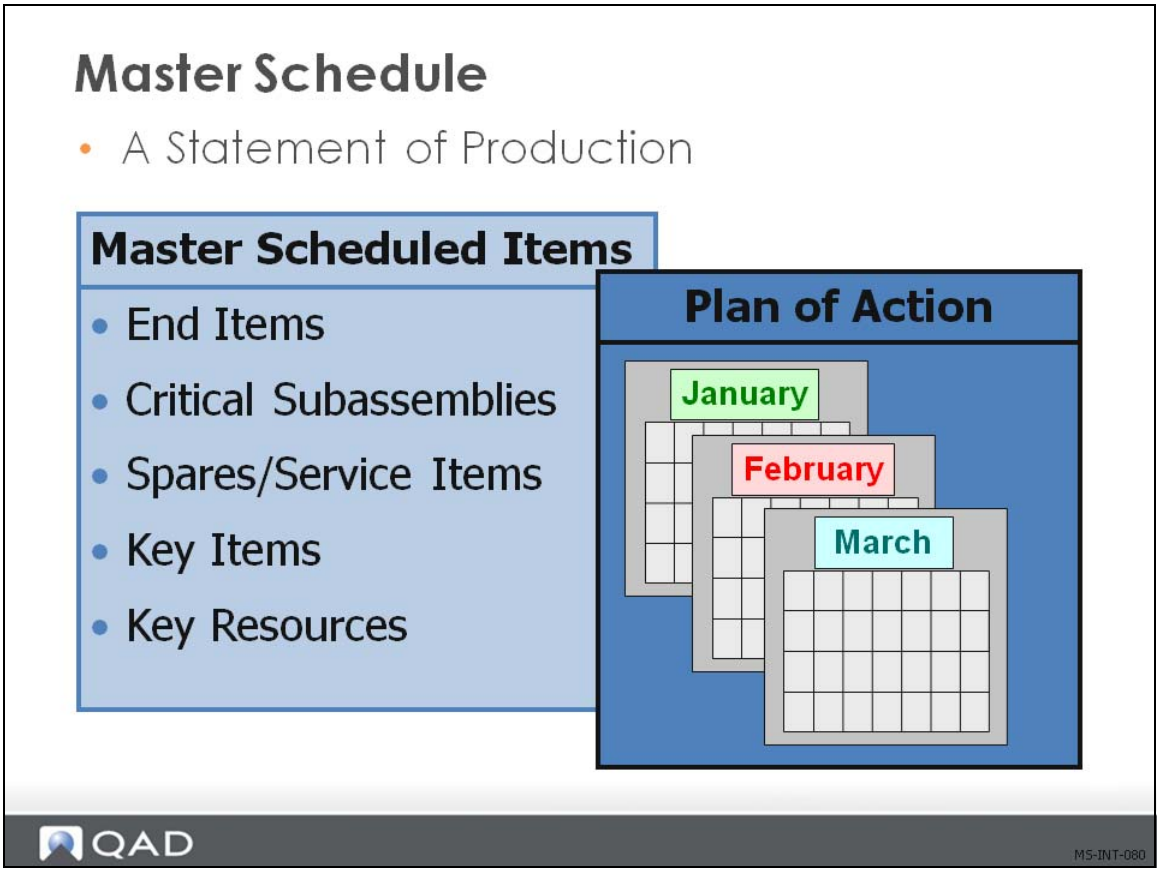
CRP differs from RCCP by taking inventories, orders, lot sizes, and lead time offsets into account. Even though RCCP indicates that sufficient capacity exists to execute the master schedule, CRP may show that capacity is insufficient during specific time periods. CRP:

- Provides the load by work center (detailed capacity)
- Offers detailed work center planning
- Indicates if capacity is sufficient to execute the master schedule
  - Department and work center levels
- Explodes the routings and processes for MRP planned and firm planned orders
  - Updates or creates work order routings
- Determines the start/due dates for each operation using:
  - Work center and shop calendars
  - Back scheduling (start date of the last operation is the due date of the previous operation)

Coordination of planning activities at different levels within a corporation is essential to meeting a company's overall goals. At the plant level, effective coordination of plans will result in:

- Increased throughput
- Decreased inventory
- Reduced operational expense

Master Schedule



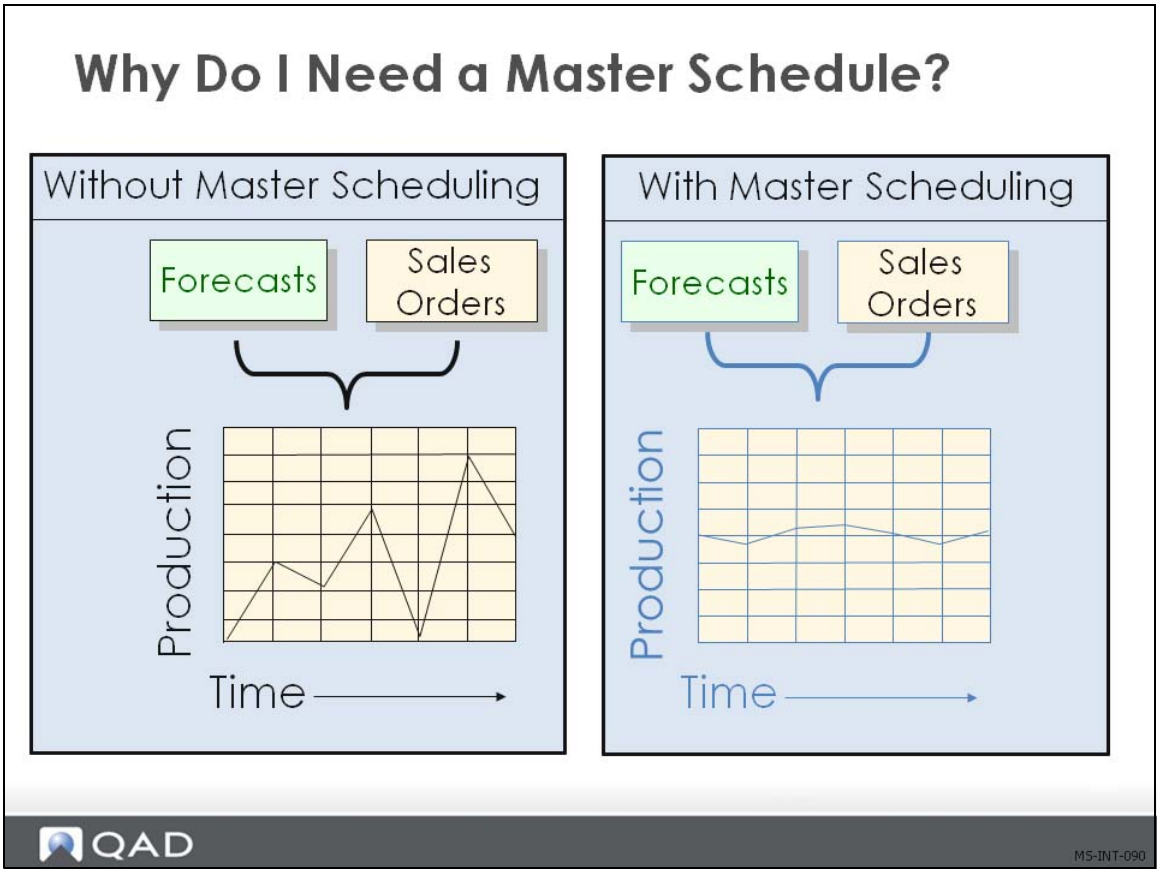
A master schedule is a statement of production set by the master scheduler. It is the key plan that drives results on the factory floor. Developed by site and item, it provides primary input to MRP.

A valid master schedule provides the foundation for effective:

- Customer delivery
- Use of plant capacity
- Implementation of the production plan
- Trade-offs between the marketing and manufacturing organizations

Master scheduled items require human judgment to evaluate the implications for capacity, material, cost, and customer service.

Benefits of a Master Schedule



The master schedule acts as a buffer between sales and forecast fluctuations and production. In QAD Enterprise Applications forecasts, along with any confirmed sales orders, are used as input to the master schedule and MRP.

Forecasts and sales orders establish a source of independent demand and are used in calculating the gross requirements for an item. For example, if 100 units per week are forecast, MRP will plan orders to cover this forecast.

As long as actual sales orders due in any period are less than or equal to the forecast in that week, the orders already planned by MRP will cover the requirements. However, if 100 units have been forecast but there are sales orders for 150 units, MRP needs to plan an extra 50 units.

What MRP will plan in any period is the amount of the sales orders plus any net remaining forecast amount.

Independent Demand

Demand for an item that is unrelated to demand for other products

- Finished goods
- Service parts
- End items
- Spare parts

Dependent Demand

Directly related to or derived from the bill of material structure for other items or end products

- Components
- Raw materials

Planning Issues

Nervousness

Fluctuations in MRP would result if forecasts and sales orders were modified or canceled

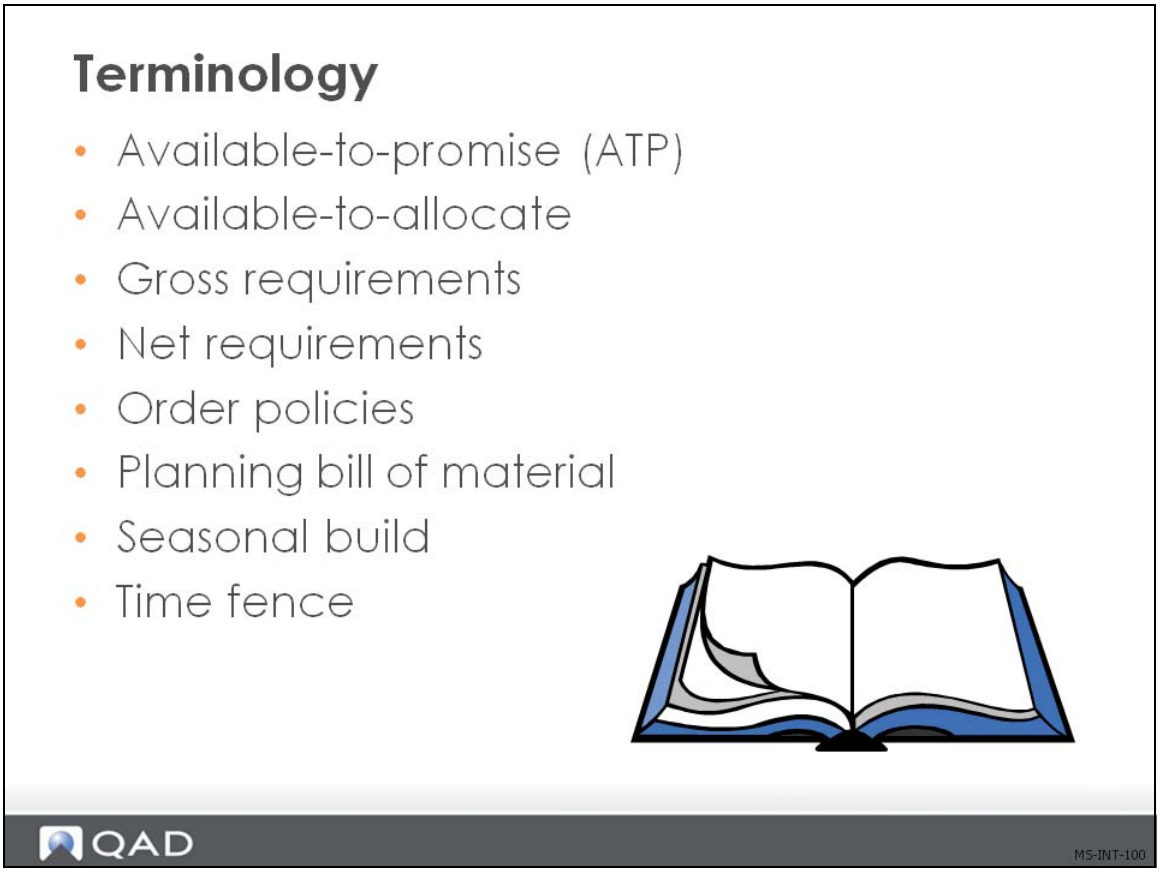
Overstated Demand

Total demand would be overstated if the forecast quantity were added to the sales order quantity. These issues are resolved in QAD Enterprise Applications by:

- Use and application of forecast consumption rules
- Creation of a master schedule that:
  - Anticipates sales
  - Stabilizes production
  - Calculates gross requirements

Note Available-to-promise (ATP) in Master Schedule Summary Inquiry (22.18) gives visibility to customer service.

Terminology



Available-to-promise (ATP). ATP is the uncommitted portion of inventory or planned production. It equals the Master Schedule less customer orders due in the period and all subsequent periods before the next Master Schedule scheduled receipt.

Available-to-allocate. Based on the calculation specified in Sales Order Control. The quantity on hand less what has already been promised to other orders

- Sales orders due to ship in the very near future
- Manufacturing orders that have been released to the shop floor

Note Future requirements or sources of supply are not considered by this calculation.

Gross Requirements. A gross requirement is the total of independent and dependent demand for a component before the netting of on-hand inventory and scheduled receipts.

Net Requirements. In MRP, the net requirements for a part or an assembly are derived as a result of applying gross requirements and allocations against:

- Inventory on hand
- Scheduled receipts
- Safety stock

Net requirements, lot-sized and offset for lead time, become planned orders.

Order Policies. Order policies are sets of procedures for determining the lot size and other parameters related to an order.

Planning Bill of Material. A planning bill of material is an artificial grouping of items or events in bill-of-material format. It is used to facilitate master scheduling and material planning.

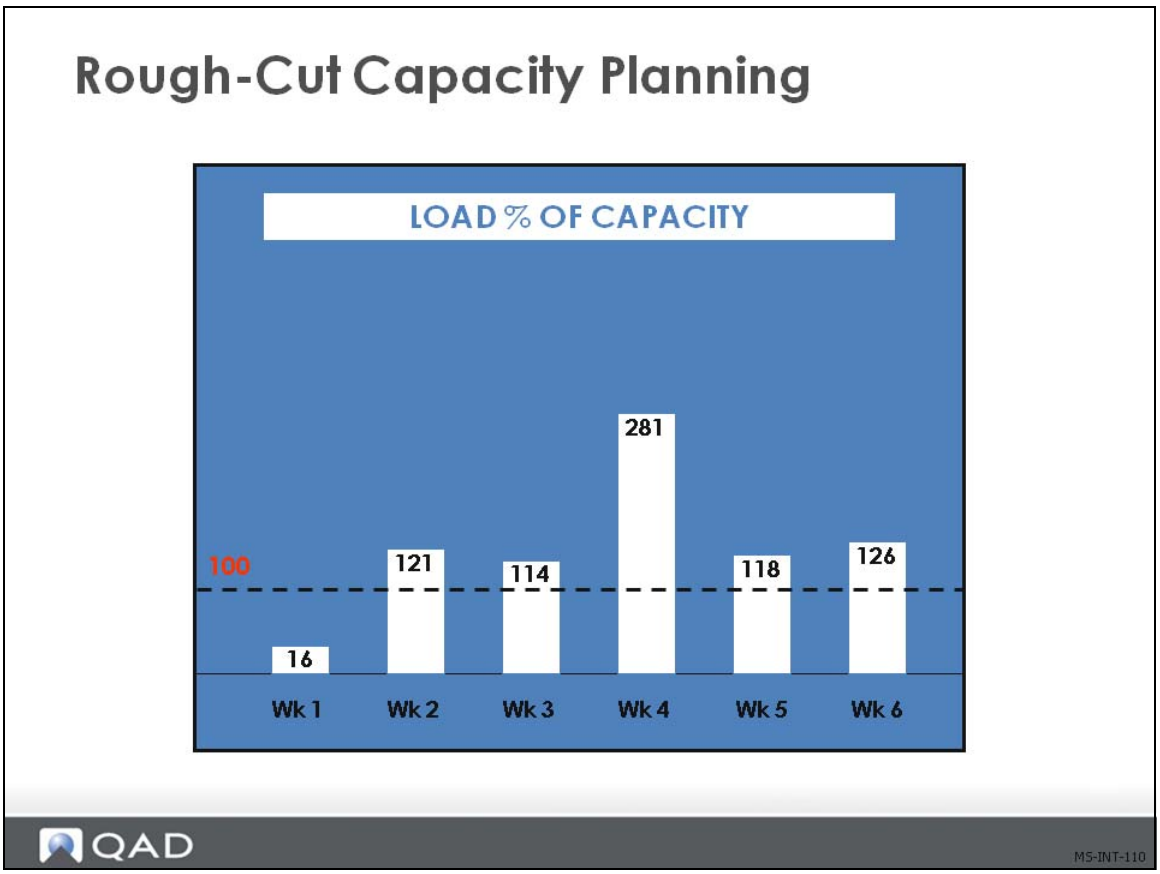
Seasonal Build. An item's inventory build-up prior to expected demand, for example:

- Christmas
- Fall
- Winter
- Spring

Time Fence. A policy or guideline established to note where various restrictions or changes in operating procedures take place.

For example, changes to the master schedule can be accomplished easily beyond the cumulative lead time, while changes inside the cumulative lead time become increasingly more difficult (to a point where changes should be resisted). Time fences can be used to define these points.

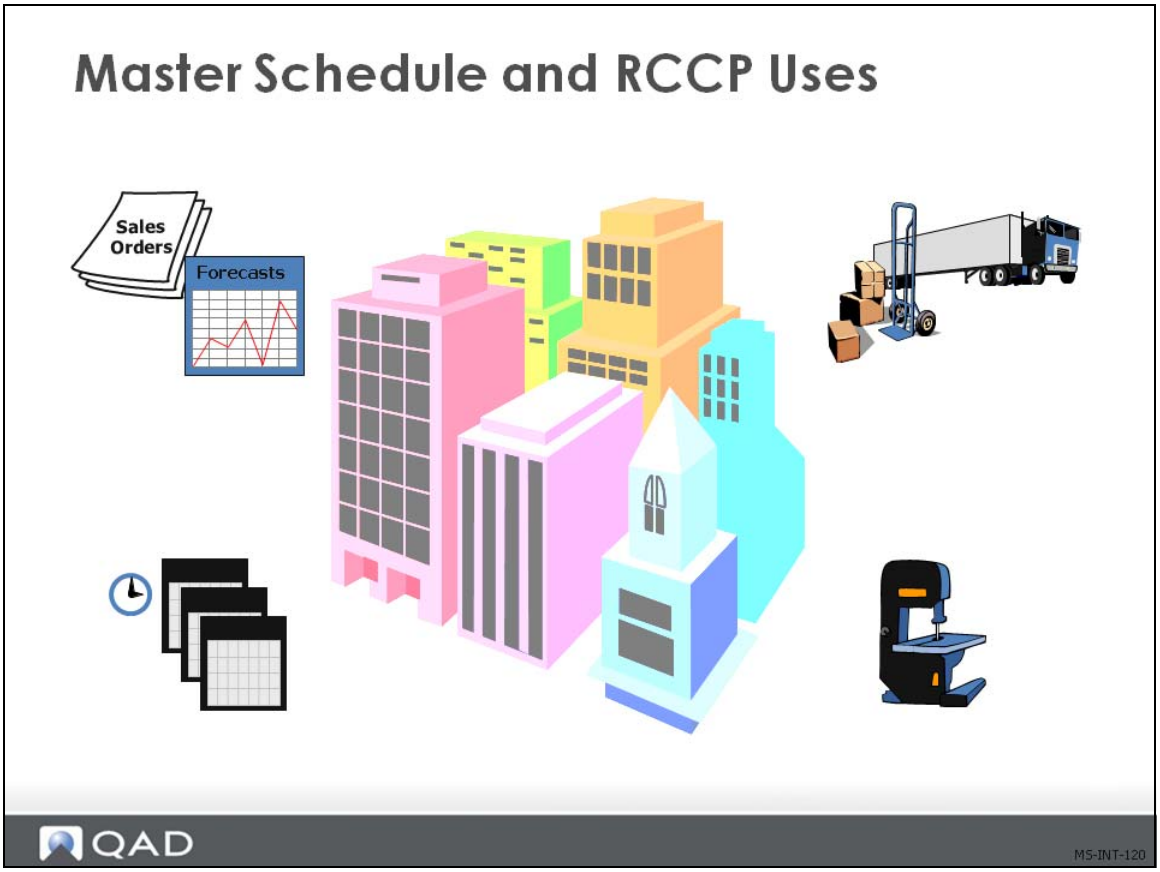
Rough-Cut Capacity Planning (RCCP)



The rough-cut capacity plan provides a tool for:

- Careful evaluation of changes to the master schedule and their impact on material and capacity
- Rough evaluation of potential capacity problems
- Proper balancing of customer needs and manufacturing needs
- Effective stabilization of MRP

Master Schedule and RCCP Uses



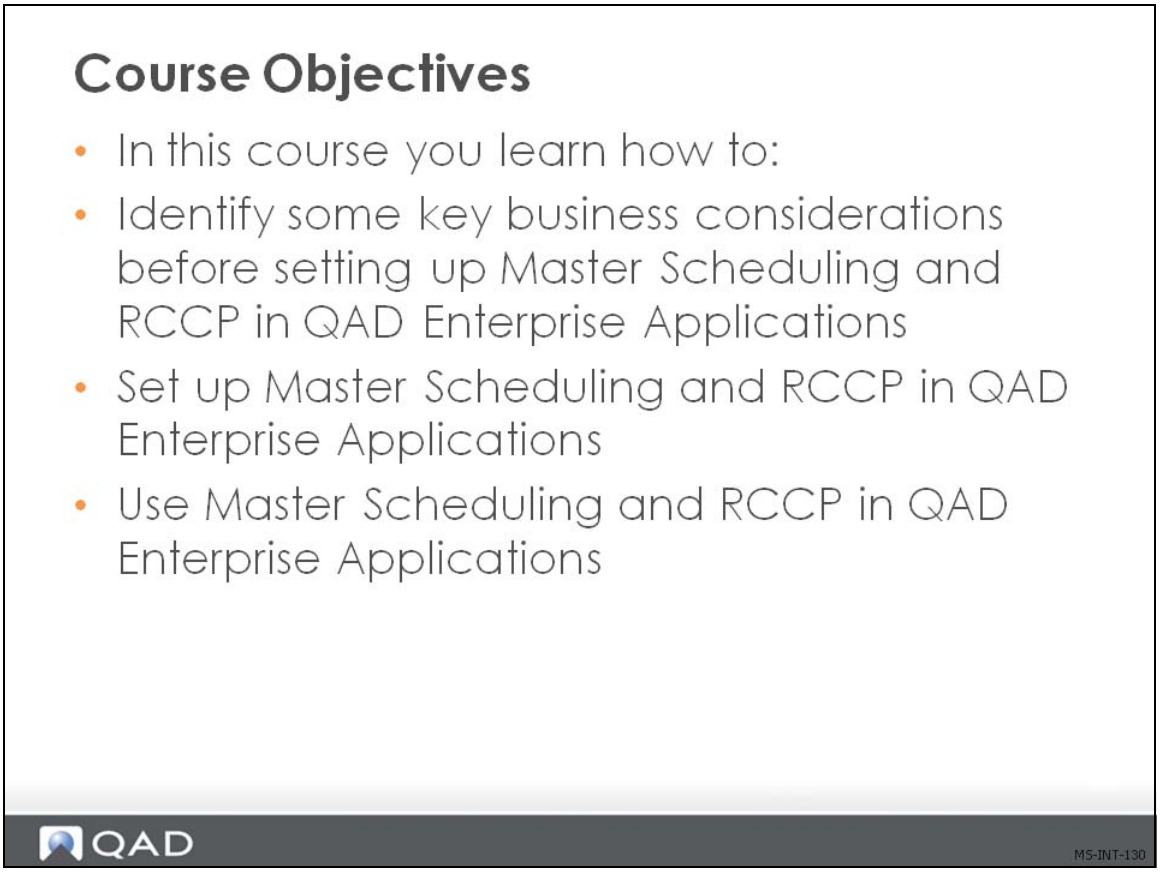
Normal uses of a master schedule include driving RCCP and MRP and planning future production.

- The production plan broken down into buildable units with specific dates for completion
- The production plan will be met if the master schedule is developed to support it

RCCP provides a high-level planning process for key resources that may constrain the execution of the manufacturing plan.

Master scheduling and RCCP should remove most of the capacity constraints before MRP is run.

Course Objectives

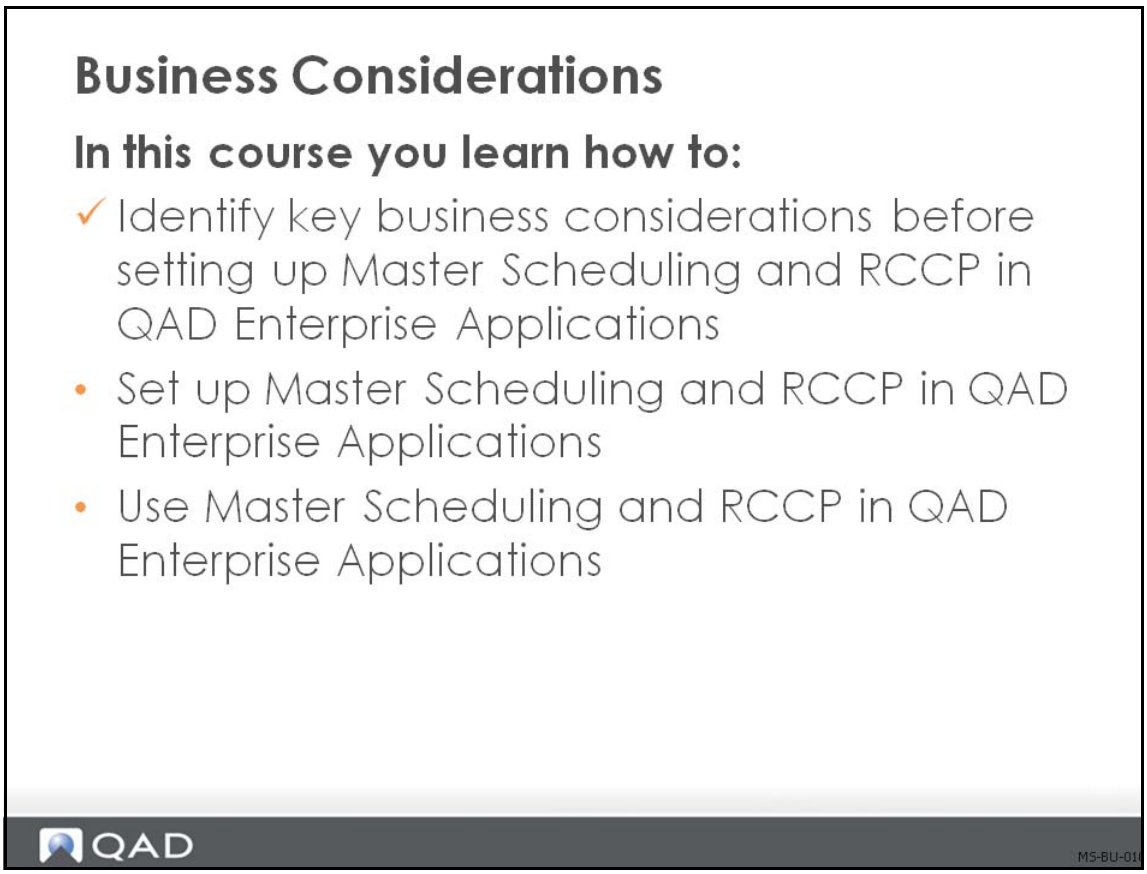


These are the course learning objectives for each chapter in this training guide.

Chapter 2

Business Considerations

Course Overview

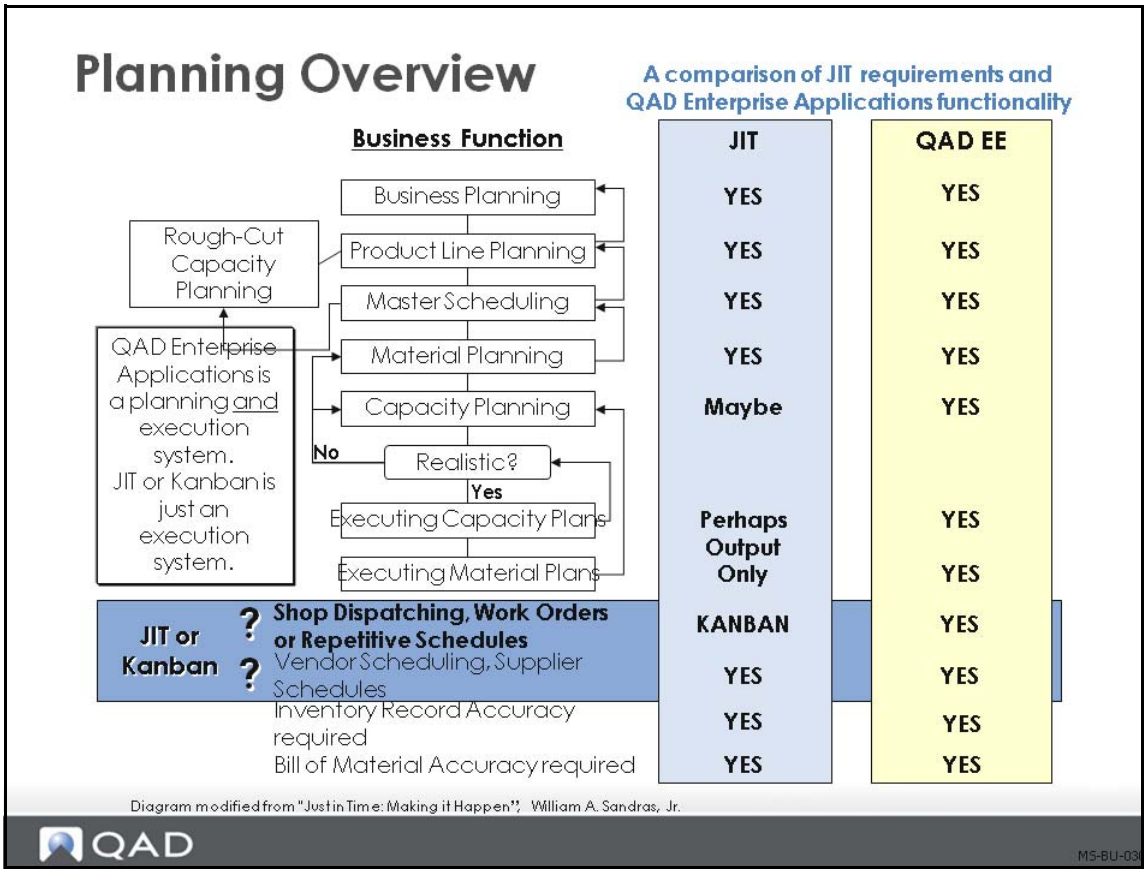


Business Considerations

There are several business issues to take into consideration before setting up master scheduling and RCCP in QAD Enterprise Applications.

This section does not discuss all of the potential issues, but presents some issues to generate thought and discussion.

Planning Overview



Set planning parameters in Item Planning Maintenance (1.4.7) or Item-Site Planning Maintenance (1.4.17).

Definition

Planning parameters are established for each item in your database; they govern the way MRP handles the items.

Why Consider?

MRP is only as accurate as the data it processes; your planning parameters should have 98% plus accuracy.

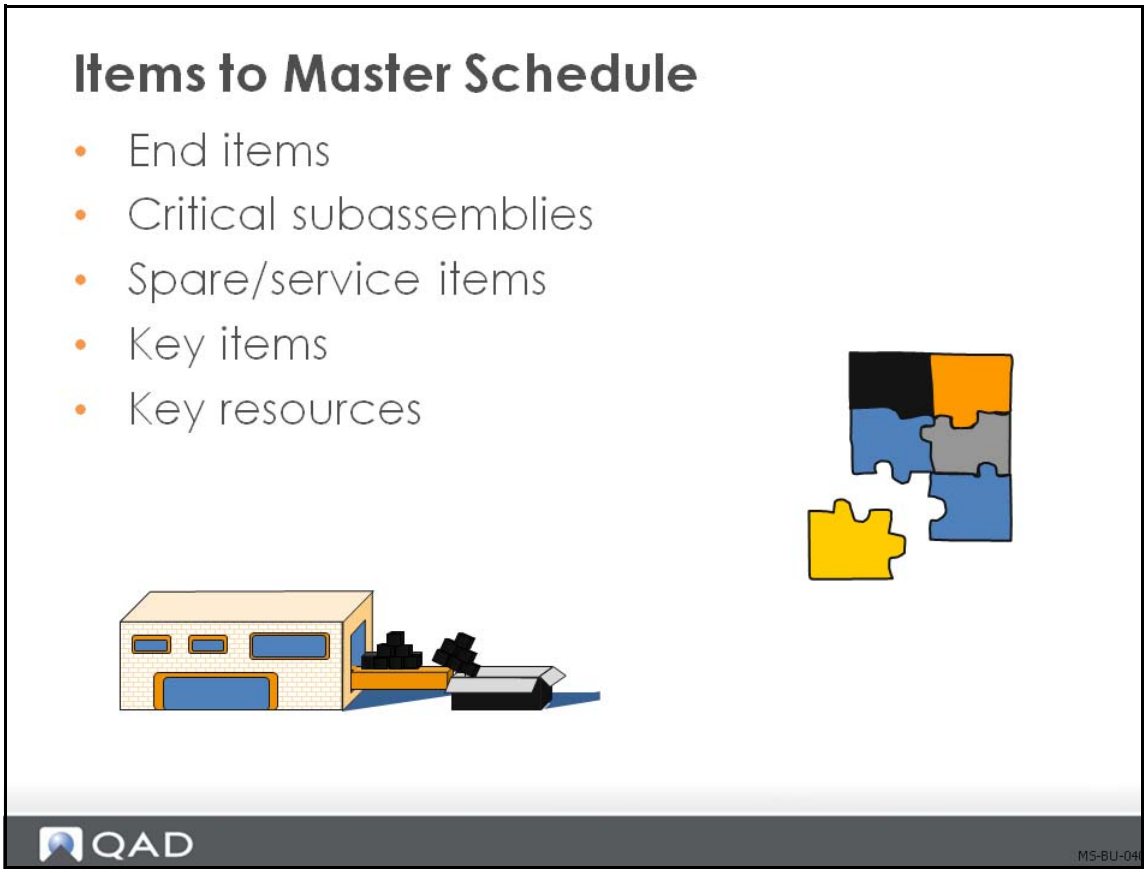
Functionality in QAD Enterprise Applications

The item planning data is the most used information in your database.

Setup Implications

- Inaccurate data can be catastrophic
- A good clean-up of the database is always worthwhile
- Once clean, database update procedures should be in place to maintain data integrity.

Items to Master Schedule



Definition

Determining which items to master schedule is a reflection of the industry, the products, and the manufacturing processes used in a particular company and requires the expertise of an experienced master scheduler.

Why Consider?

Sometimes, demand for an item is dependent on demand for another item. This is common when the master schedules for several sets of items are related by planning bills or product structures.

Functionality in QAD Enterprise Applications

Set Master Schedule to Yes in Item Planning Maintenance (1.4.7) or Item-Site Planning Maintenance (1.4.17) for multiple sites.

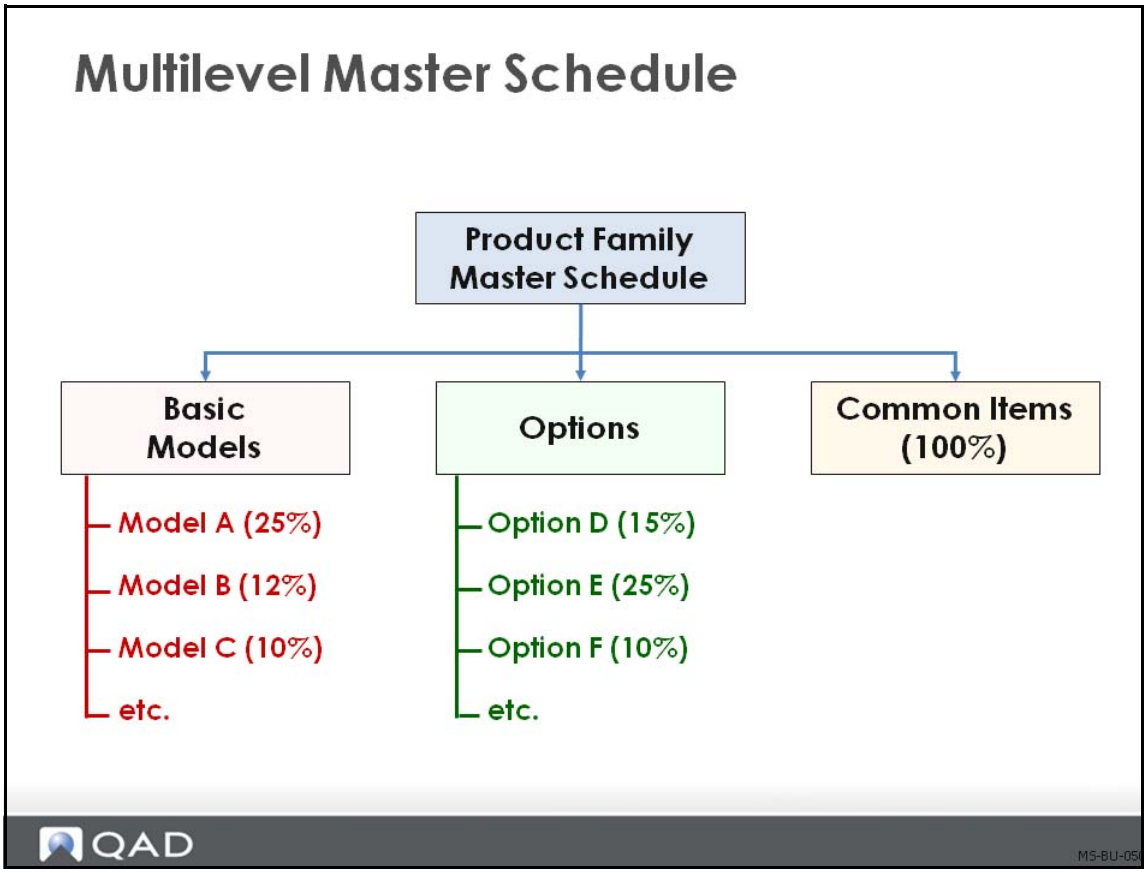
- Output for the master schedule is a plan for all items using MRP and product structures
- Input for the master schedule can come from:
  - Forecast Maintenance (22.1) (automatic link)
  - A product line plan

Note In QAD Enterprise Applications, there is no link between the master schedule and the product line plan

Setup Implications

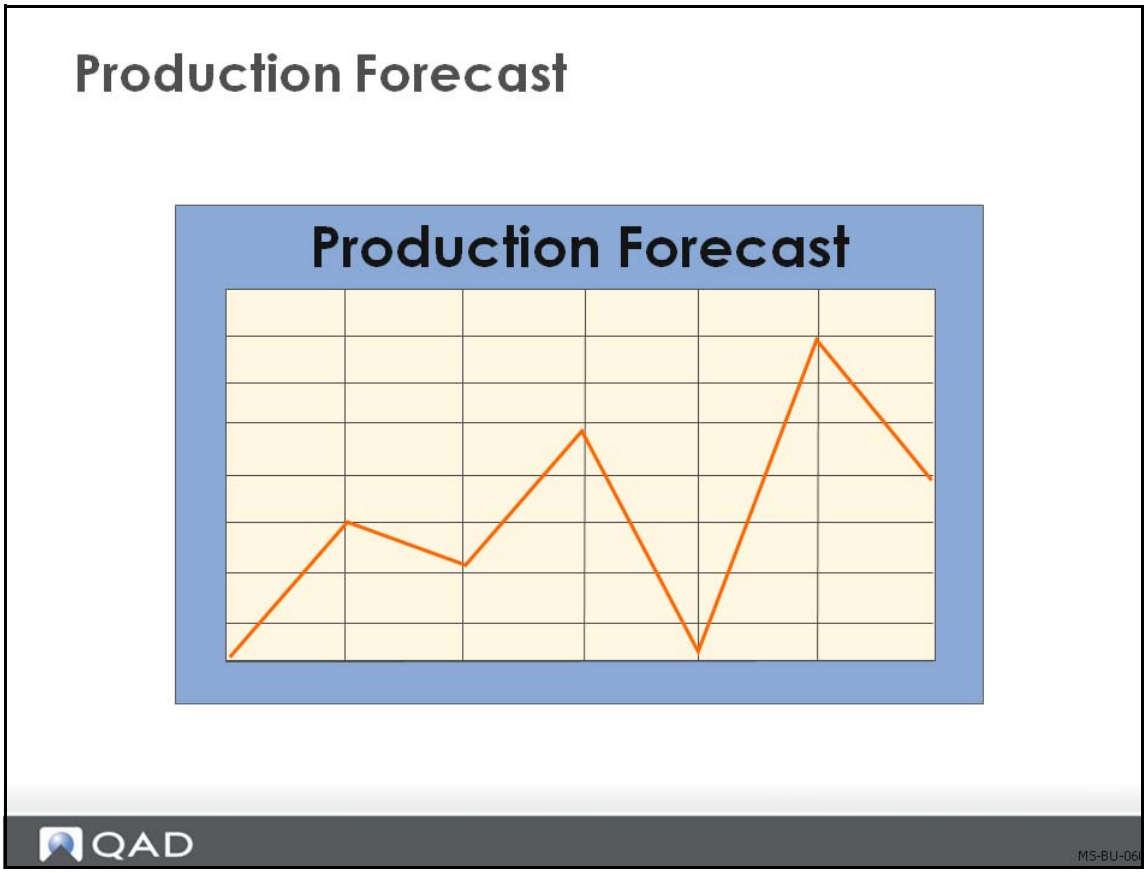
An item can be master scheduled at one site and not another.

Multilevel Master Schedule



Multilevel master scheduling is an approach where a planning bill of material is used to master schedule an end product or family, along with selected options and accessories.

Production Forecast in QAD Enterprise Applications



Definition

A production forecast is a system-calculated forecast resulting from a planning bill of material and occurs when using multilevel master scheduling. It estimates the projected level of customer demand for a feature (options, accessories) of a make-to-order or an assemble-to-order product.

When you establish planning bills and forecast and master schedule at the family-item level, the system automatically calculates the derived demand for components of the family or upper-level item. These calculations are based on the available-to-promise quantities for the family-level item and the quantity per and forecast percentage for the components of that family item.

Why Consider?

As forecast for the family-level item is consumed, the available-to-promise quantity for that item changes, resulting in revised calculations for the production forecast the next time MRP is run.

Functionality in QAD Enterprise Applications

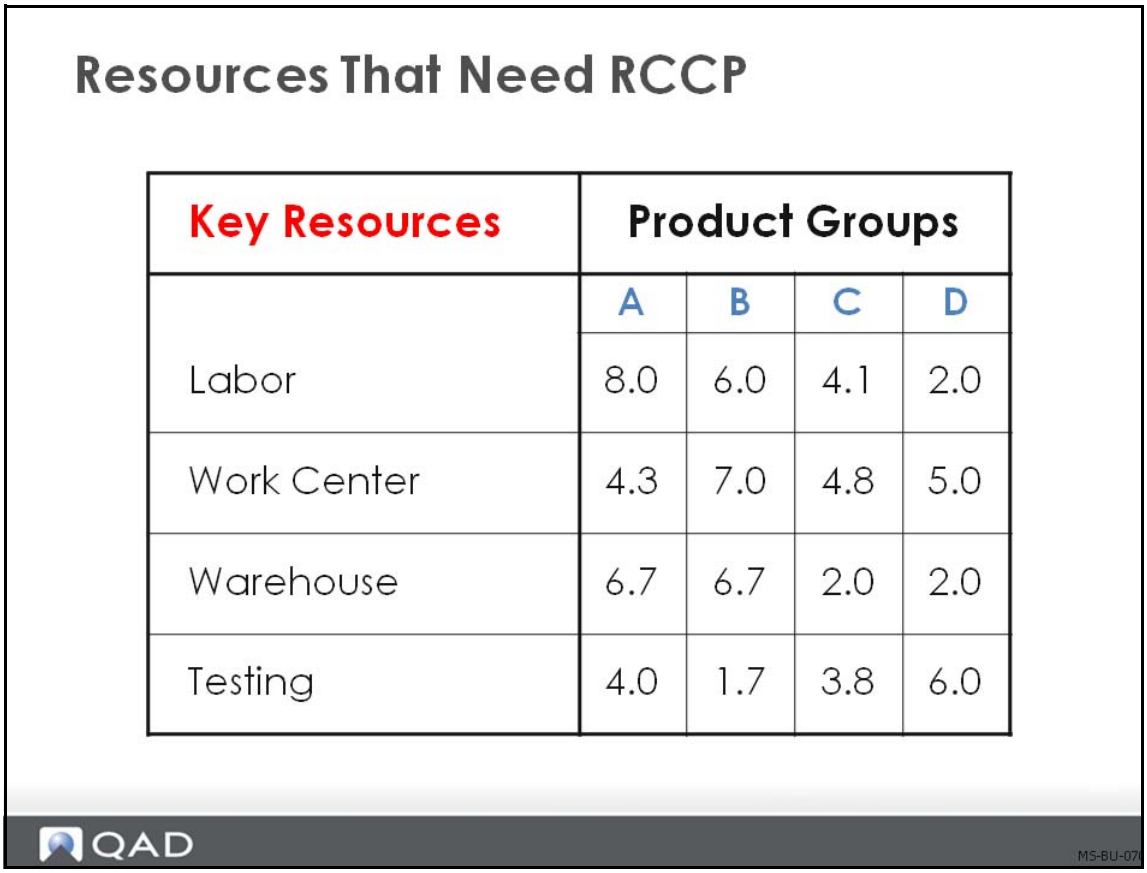
- The *production forecast* derives from:
  - The master schedule and forecast percentage specified in the planning bill
- Production forecast amounts:
  - Display in master schedule reports and inquiries

    - Contribute to the total demand that MRP regards as input
- Production forecasts are only created for components with structure codes:
    - (P)lanning
    - (O)ption

Setup Implications

- Production forecasts only consume at the higher level

Determine What Resources Need RCCP



- Develop a resource profile to identify critical resources

Seasonal Build Requirements

Definition

Seasonal demand items require a buildup of an item's inventory prior to its expected demand.

Why Consider?

Although you could enter master schedule orders to adjust to seasonal requirements, identifying a demand as seasonal build prevents MRP from issuing action messages to cancel or delay orders for those items whose demand is not yet apparent.

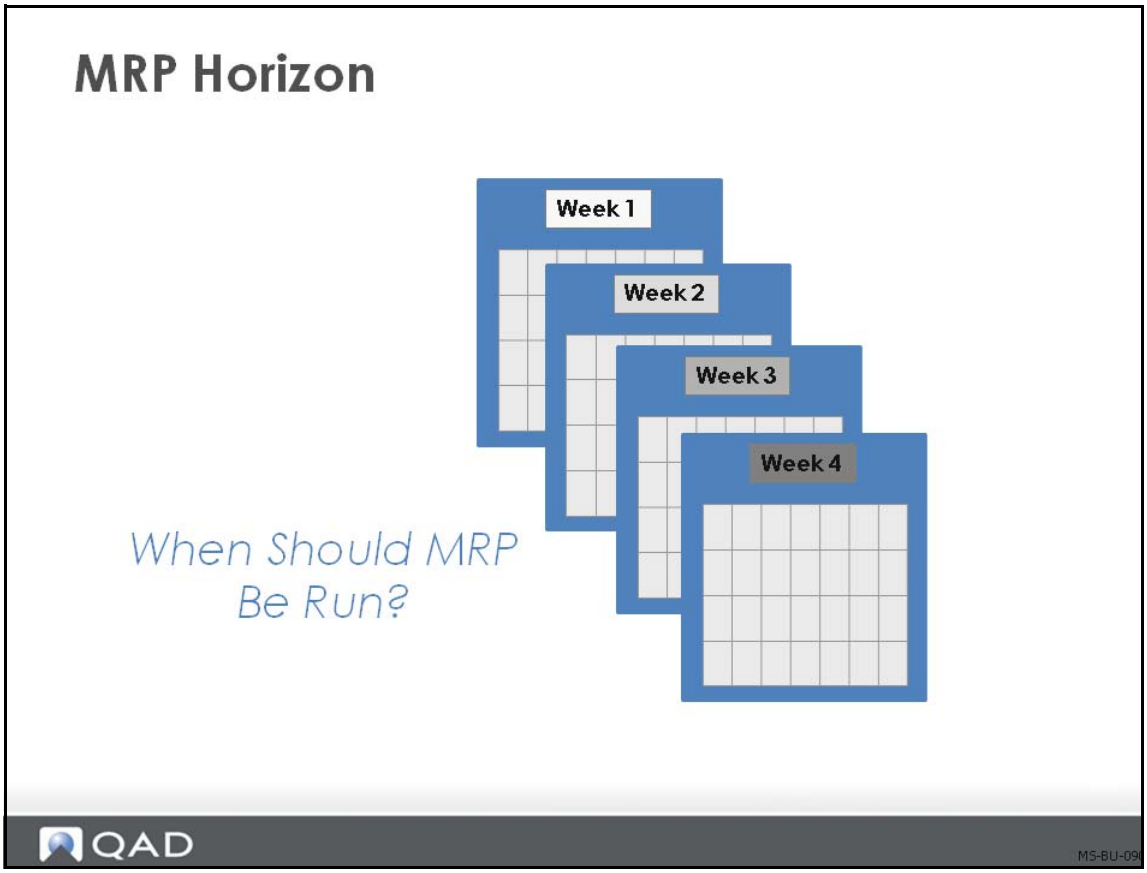
Functionality in QAD Enterprise Applications

In QAD Enterprise Applications, seasonal build inventory is entered into the system using Seasonal Build Maintenance (22.9).

Setup Implications

Setting inventory to zero enables the items to be promised.

MRP Horizon



Definition

- Amount of time the master schedule extends into the future

Why Consider?

MRP only processes material requirements within this horizon and ignores activity outside this horizon. You need to allow time for:

- Ordering components
- Capacity changes of primary work centers or key suppliers
- Minimum cumulative lead time

Functionality in QAD Enterprise Applications

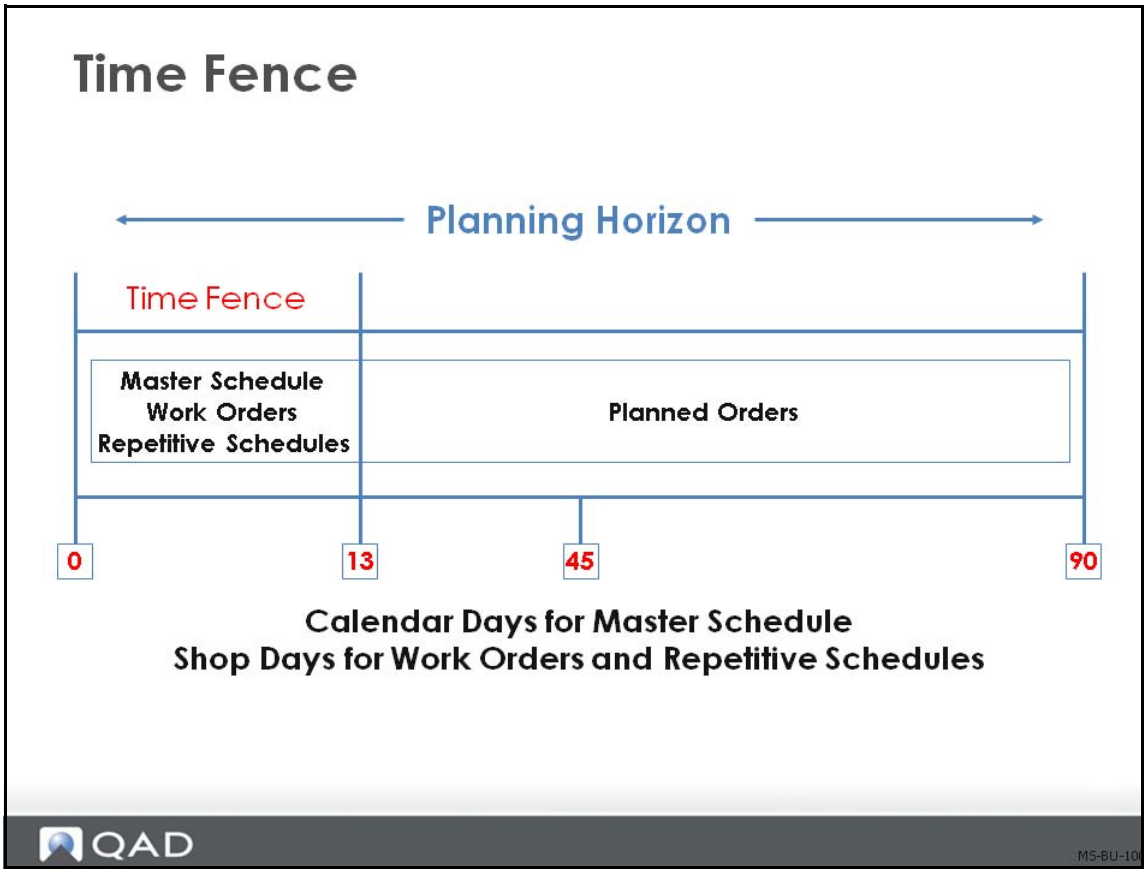
- Set the planning horizon in MRP Control
- Ensure that all items are replanned by running the Regenerate Materials Plan (23.2)

Since MRP ignores activity outside of the planning horizon, make the horizon at least one day longer than the longest cumulative lead time (30 days is recommended as a minimum). Use the Cumulative Lead Time Report (13.12.16) or the Lead Time Picture Report (13.12.17) to find the longest cumulative lead time in your database.

Setup Implications

- If the horizon is changed, items are not automatically flagged for net change replanning, run Regenerate Materials Plan (23.2)

Time Fence



Definition

The number of calendar days inside of which MRP should not automatically make changes. To manually control the schedule for a period of time set the time fence to *nn* days and MRP:

- Adds the number of days time fence to the system date
- Does not create any planned orders within this time period

Note Time fence is most often used with master scheduled items.

Why Consider?

The time fence gives the master scheduler manual control within the time fence period. MRP is allowed to create planned orders automatically outside of the time fence.

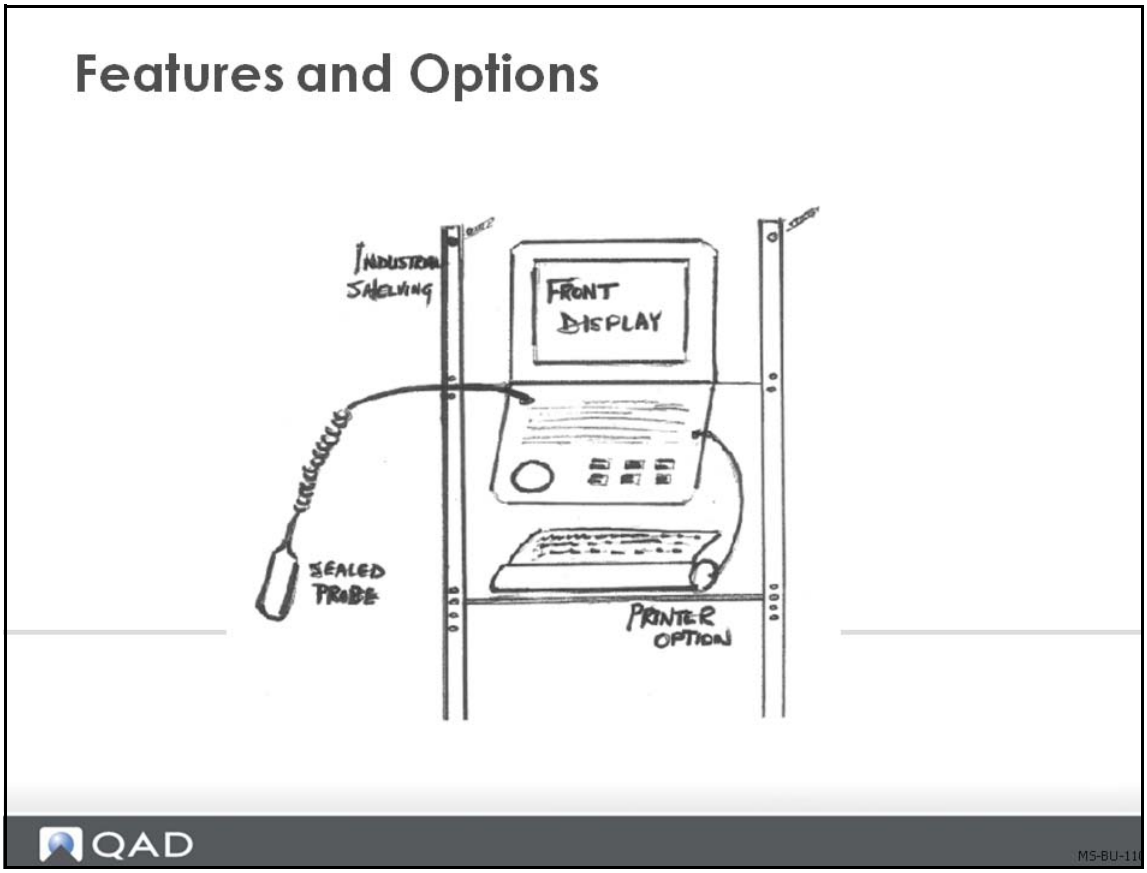
Functionality in QAD Enterprise Applications

The value entered in Item Master Maintenance (1.4.1) is used as the default for all sites. It may be changed manually for any site as needed.

Setup Implications

The time fence designates a period of calendar days from the system date inside of which MRP will not create or change existing planned orders. Order action messages, however, will be generated if necessary. MRP will provide action messages over the near-term horizon.

Features and Options



Definition

Components of the family item in the planning bill can be either the actual manufactured items or configured products, or item groups representing common components or selected features and options.

Why Consider?

Directly forecast the family/models and forecast options by percent of family.

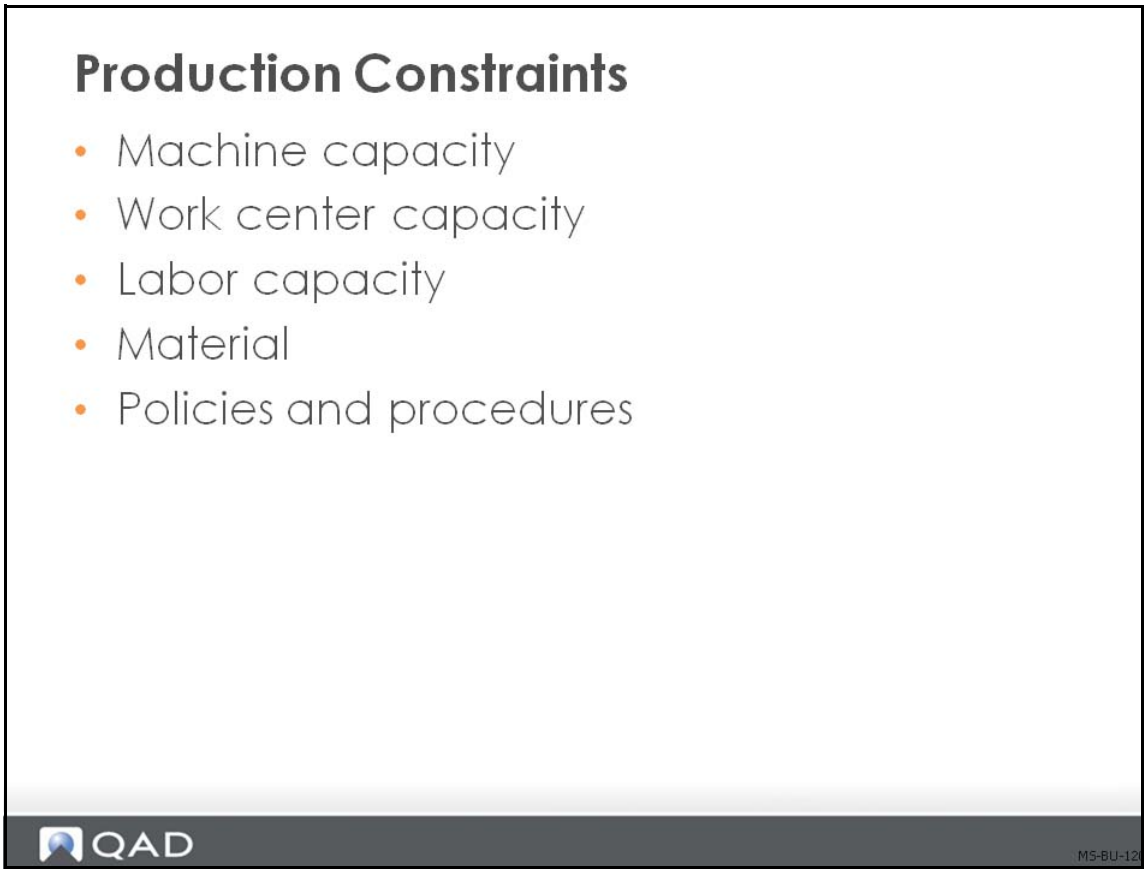
Functionality in QAD Enterprise Applications

The top-level item of a multilevel master schedule product structure represents the family of buildable products that can be configured from a set of available models and options.

Setup Implications

For master scheduling purposes, it is not possible to forecast accurately the detailed combinations of potential products that can be manufactured and sold. Forecasting at the family-item level or the option-item level is accurate and can drive the master scheduling process.

Production Constraints



Definition

A production constraint is any element or factor that prevents a system from achieving a higher level of performance with respect to its goal.

A priority item plan will help resolve production issues. It sets the number of priority items (end items, level 1 items, service parts, and so forth) that are going to be produced and plans the schedule to produce them. The check on this plan is the availability of critical resources.

If you want to make 150 items next week but your machine only makes 125 in a week, you cannot meet the plan. A component plan determines which work centers and components will be used to meet the plan. The check determines if the work centers have the capacity to meet the schedule.

Why Consider?

A master scheduler must consider and remove potential production constraints when preparing the master schedule and rough-cut capacity plan. A constraint could be physical (machine capacity or lack of material) or managerial (policies and procedures).

Functionality in QAD Enterprise Applications

The master scheduler makes the best use item-level RCCP by considering constraints. RCCP is implemented in QAD Enterprise Applications using Item Resource Load Summary Inquiry.

Setup Implications

The master scheduler tests scheduled production quantities against available resources. This rough-cut capacity plan tests end-item production.

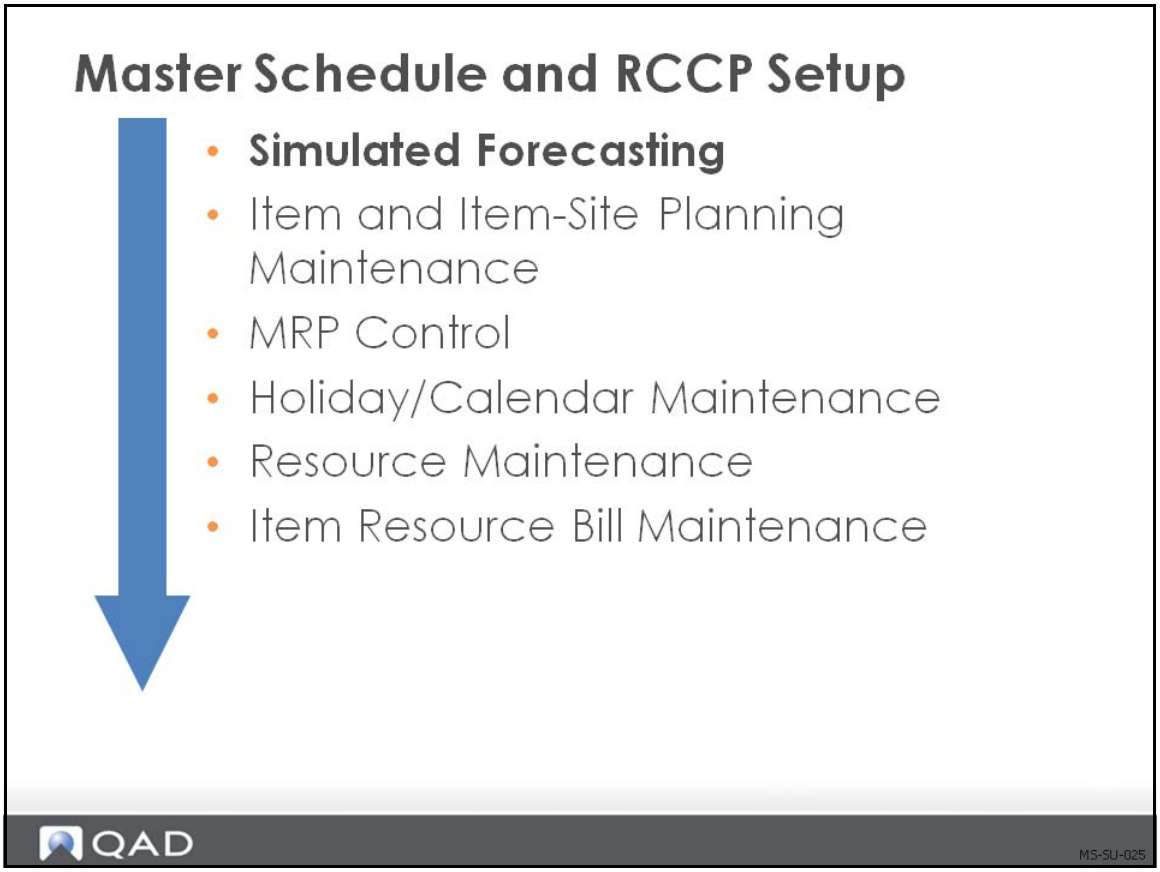
Summary


Review
Processes and Procedures
Reporting Requirements
Customer Expectations
Product Configuration
QAD

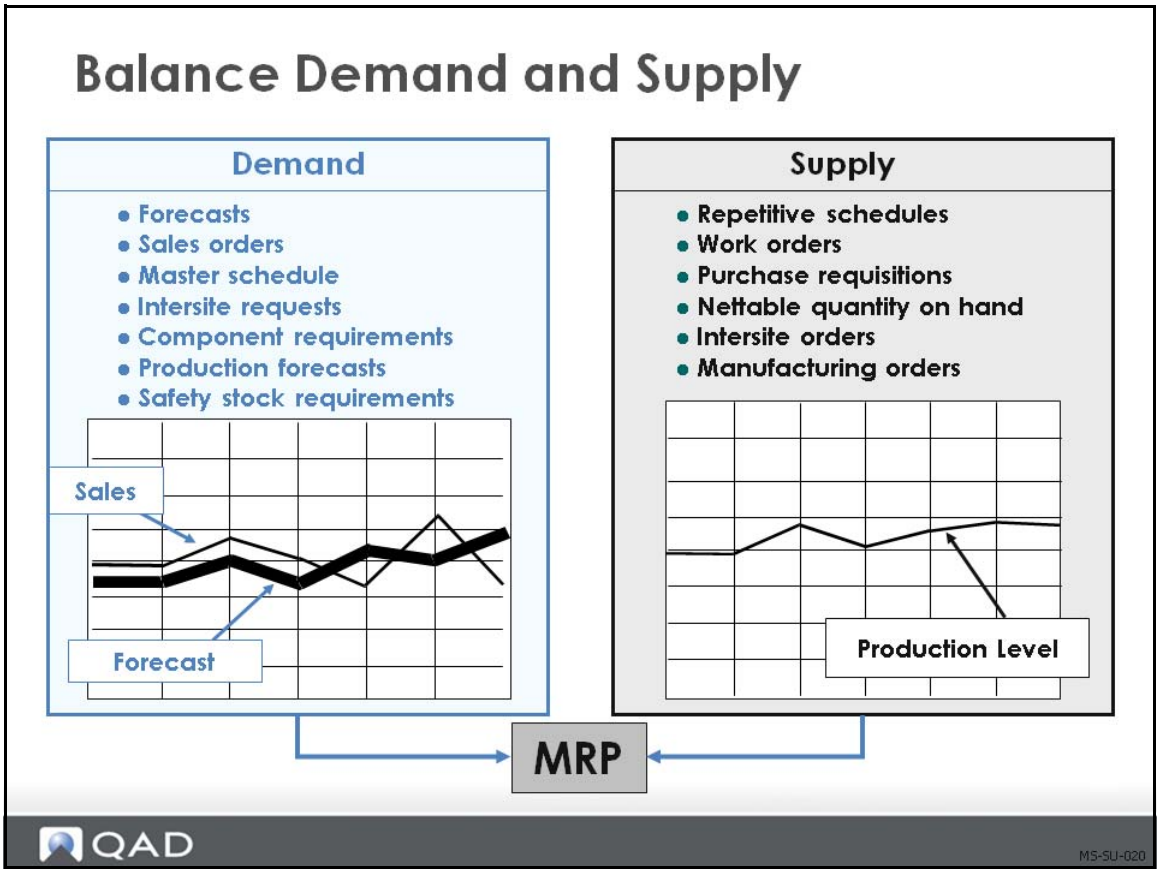
Chapter 3

Set Up Master Scheduling and RCCP

Simulated Forecasting



Balance Demand and Supply



The master schedule represents supply that then creates component demand for MRP. Master scheduled items require human judgment to evaluate the schedule and its effects on capacity, material, cost, and customer service. The master scheduler creates required supply orders to meet demand after considering requirements for:

- Independent demand (forecasts and sales orders)
- Dependent demand (related to or derived from the BOM structure for other items or end products), especially when scheduling for important spare parts
- Abnormality
- Seasonality
- Consumption

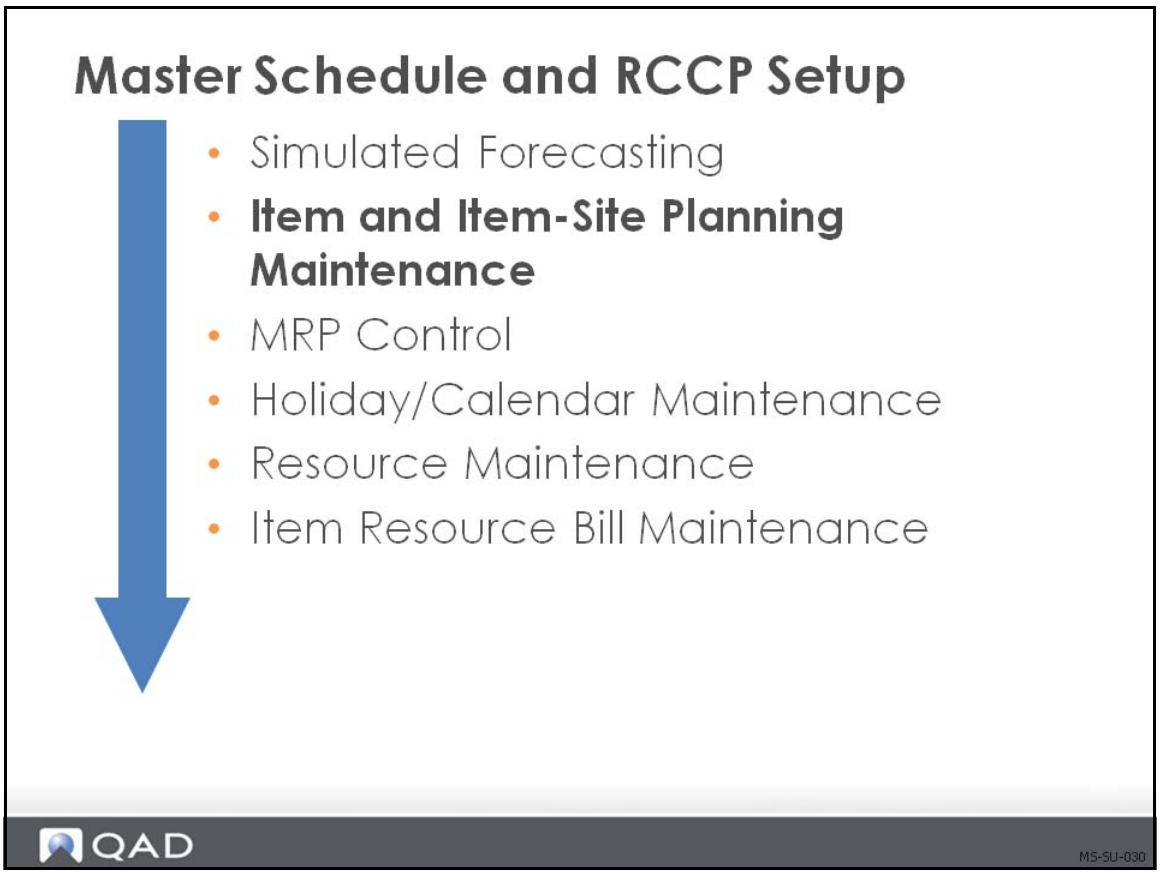
Sales order demand is the quantity of an item sold, as recorded on confirmed sales orders or required ship schedules. The system recognizes item quantities ordered as demand when a sales order has been confirmed.

- Confirmed is Yes in Sales Order Maintenance (7.1.1)
- A customer planning or shipping schedule has been changed to a required ship schedule using Required Ship Schedule Update (7.5.5)
- Selective Required Ship Schedule Update (7.5.6)

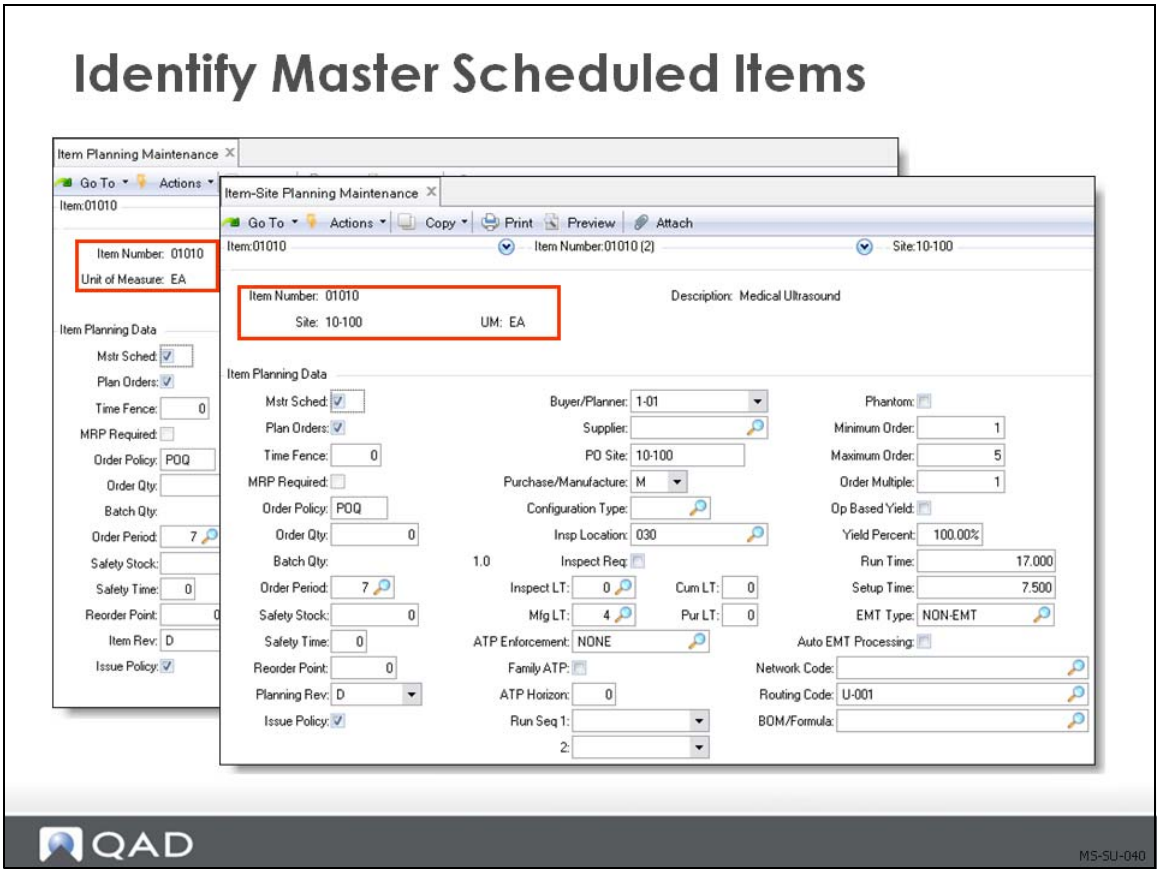
Sales order demand:

- Consumes shipment forecasts based on the item number, site, quantity, and due date recorded on the sales order or customer schedule
- Is abnormal if the quantity or source of demand is not characteristic of quantities anticipated by the current forecast and should not be used to plan future forecasts

Item and Item-Site Planning Maintenance



Identify Master Scheduled Items



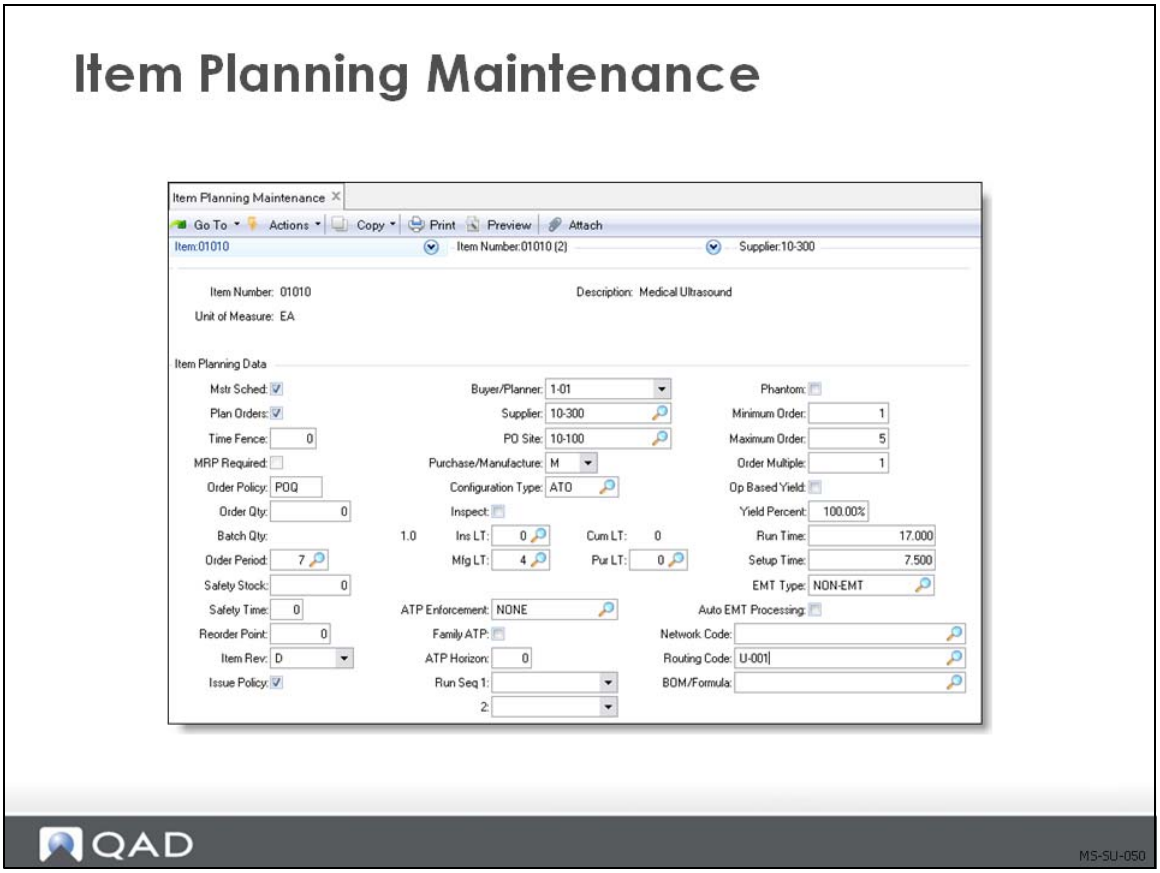
To define an item as master scheduled, set Master Schedule to Yes for that item in:

- Item Master Maintenance (1.4.1)
- Item Planning Maintenance (1.4.7) or
- Item-Site Planning Maintenance (1.4.17) (for multisite environments)
  - Most items are set up with Plan Order set to Yes
  - Sometimes master schedule items have this field set to No

If criteria at each site are the same, use Item-Site Planning Maintenance (1.4.17) (the default for all sites). The system looks at item master data only when no site-specific data has been entered, or when dealing with the item at the default site established in Item Master Maintenance (1.4.1).

Note Master schedules can be created and maintained entirely by master schedulers entering firm planned orders using Master Schedule Order Maintenance or Work Order Maintenance.

Item Planning Maintenance



Master Sched. This field is Yes for master scheduled items. These items may be planned separately using Selective Materials Plan (23.3). This allows development of the master schedule for:

- Independent demand items
- Planning for dependent demand items

Plan Orders. Most items are set up with Plan Order set to Yes.

Sometimes master scheduled items have this field set to No, allowing manual interaction with the system.

Indicates whether Material Requirements Planning (MRP) should create planned orders for this item. Planned orders are orders with a suggested order quantity and due date calculated by MRP to meet planned future demand.

The Plan Orders field operates in combination with the Order Policy. If Order Policy is blank, MRP does not plan this item, regardless of the Plan Orders field. No requirements or action messages are generated.

Time Fence. Time fence is most often used with master scheduled items. It is the number of calendar days inside of which MRP should not automatically make changes to the plan.

- MRP adds the number of days time fence to the system date and does not create any planned orders within this time period

- MRP will delete any planned order (either inside or outside of the time fence) if there is no demand generated for the item
- On firm orders, if change is needed, MRP creates an action message alerting you to what must be done
  - The message “Time Fence Conflict” reminds you why MRP didn't make the change
- To control the schedule manually for a period of time (the next two weeks, for example), set the time fence to 14 days

MRP Required. A system maintained field indicating whether an item needs to be replanned

- Net Change Materials Plan (23.1) determines which items to include using this field; it only replans items with MRP Required set to Yes
- An item is automatically flagged for replanning whenever a change is made that affects order timing or quantity, such as:
  - Planning data
  - Inventory balance
  - Product structure
  - Purchase requisitions and orders
  - Sales orders
  - Work orders
  - Master schedule
  - Repetitive schedule
  - Forecast
- If MRP Required is Yes, it reflects changes made after the item was planned by MRP

Order Policy. A code controlling the MRP process for this item/product. Values are:

- Period Order Quantity (POQ)
  - A planned order is created to cover the requirements for a specified number of calendar days, as specified in Order Period.
- Fixed Order Quantity (FOQ)
  - Planned orders are created with the order quantity specified in the Order Qty field
  - If the value for Min Ord is greater than Order Qty, planned orders are created with the order quantity specified in the Min Ord field instead
  - Order Qty must be greater than zero (even if Min Ord is greater than zero) for creating planned orders
- Lot for Lot (LFL)
  - A separate MRP planned order is created to satisfy each net requirement
  - If there are many sources of demand, MRP creates many planned orders
- One Time Only (OTO)
  - A single order is created with an order quantity of one
  - Could be used to plan project activities and milestone events that happen only once
- Blank

- Obsolete parts, reorder parts, Kanban
- MRP will not calculate

Note Any other non-blank value is processed as LFL.

Whenever a net requirement exists, MRP creates a planned order to fill it. The quantity and due date of the order are determined by the order policy, lead time, and order modifiers.

- If the Order Policy is not blank and the Plan Orders field is Yes, MRP plans the item
- If the Order Policy is not blank and the Plan Orders field is No, then MRP plans the item but does not create planned orders
  - Only action messages are created, suggesting what orders should be entered manually
- If Order Policy is blank, MRP does not plan this item, regardless of the Plan Orders field
  - No requirements or action messages are generated

The traditional technique for managing the master schedule is to enter and maintain master schedule orders manually, using action message reports.

This process becomes unwieldy if you have a large number of master scheduled items, but may work quite well in some situations. To do this, master scheduled items should be set up with the following:

- Master Schedule is Yes
- Plan Orders is No
- Order Policy is any value but blank

Order Qty. The normal order quantity for this item or base process

- If this item has an Order Policy of FOQ, all MRP planned orders are created with this quantity
- For manufactured items, order quantity identifies the normal or average order quantity of the item
- When manufacturing costs are calculated using Routing Cost Roll-Up, setup costs are divided by this order quantity
- When manufacturing lead times are calculated, they are stated in terms of this order quantity
- If this quantity is zero, the system assumes an order quantity of 1 for cost calculations only
- Not used for co-product or by-product items when planned from a base process
- In a process environment, item Order Quantity should always be the same as the formula Batch Quantity; this must be set manually

Warning This value affects both cost and lead time calculations and can significantly impact scheduled due dates. Order due dates are determined using the standard manufacturing lead time (for the standard order quantity). If orders are entered for a much different quantity, due dates must be adjusted manually.

Batch Qty. A system maintained field recording the normal batch quantity for an item. Used only with formula/process functions

- Ingredient quantity per and process operation run times are stated in terms of batch quantity
- This quantity is updated by the Batch Quantity Change function

Whenever you change the formula Batch Quantity, make sure that you also change the item Order Quantity. These should always be the same. This must be done manually.

Order Period. This field operates only if the Order Policy is set to POQ. Then MRP looks ahead this number of days when calculating net requirements. One planned order is created to cover the requirement for this period.

- Validated against predefined values, if any, entered in Generalized Codes Maintenance (36.2.13)
- Number of calendar days to cover by one MRP planned order (default is 7)

Safety Stk. Safety stock is the quantity of this item to be maintained in inventory as protection against fluctuation in demand and/or supply. Safety stocks may be particularly important for critical items, a shortage of which can shut down production.

- MRP processing considers safety stock a requirement and schedules planned orders to cover it
- As soon as quantity on hand falls below the safety stock quantity, MRP plans an order
- Safety stock and safety time can inflate inventory levels
  - Safety stock can trigger MRP planning an order even if there is no “real” demand
  - Safety time consistently plans to have inventory on hand before it is actually needed

Note Reorder Report (3.6.2) is the only report in the system that shows safety stock.

Safety Time. MRP schedules planned orders to be received this many days early; acts as a hedge against late deliveries

Reorder Point. The inventory level at which this item should be reordered

PO Site. The PO site entered on the requisition determines which purchasing department takes action on this requisition.

Pur/Mfg. Purchase/manufacture code controls how the system:

- Explodes forecasts
- Plans and creates orders
- Calculates costs for the item

Code options include: Purchased (P), DRP (D), manufactured (M), routable (R), configured (C), line manufactured (L), flow scheduled (W), and family (F)

Configuration. Allows users to determine if a configured item is assemble-to-order (ATO) or a kit (KIT).

- ATO
  - A discrete end item in itself, produced from a combination of various components
  - The configuration defines components or ingredients of a finished product
- KIT
  - A set of items that are picked for shipment
  - No real assembly takes place
  - Not a physical entity in and of itself; it only exists as a logical superset of its components

Mfg LT. The normal or average number of working days it takes to manufacture this item

Pur LT. Normal number of calendar days it takes to complete a purchasing cycle for this item

Inspect. Indicates whether this item is to be inspected after receipt

Ins LT. The normal or average number of working days needed to inspect this item after it is received

Cum LT. The longest possible length of time it would take to have this item/product available if you started today with no components in stock. The system looks at the manufacturing lead time of this item and its subassemblies, and the purchasing lead time of the raw materials to determine the critical path

Example You are making washing machines from all purchased components. Most components have a purchasing lead time of 4 days or less, except motors, which have a purchasing lead time of 20 days. If it takes 2 days to assemble the machine, the cumulative lead time for a washing machine is 22 days, the longest possible time.

Network. A code used to identify a set of sourcing relationships; considered only when Pur/Mfg Code is D (DRP)

Routing Code. A code identifying the routing or process normally used in the manufacture of this item. Operates only for manufactured items. Accesses the routing operation steps to:

- Calculate product cost
- Plan for material and capacity

BOM/Formula. A code identifying the product structure, formula, and/or co-product/by-product structure normally used to manufacture this item. For co-products/by-products, this is the base process code

Issue Policy. A code indicating whether this item should be issued on work order picklists

Phantom. Indicates if this item is normally stocked or is put together as part of a higher level assembly

Min Ord. The minimum quantity of this item to be ordered on a single order. MRP uses Min Ord to determine the quantity of planned orders, regardless of the Order Policy

- If net requirement is below this amount, MRP creates an order for this minimum quantity
- If an existing order is below this minimum, MRP creates an action message

Max Ord. Zero (default) means there is no maximum of this item to be ordered on a single order.

- If MRP calculates a requirement greater than this, it creates a planned order for the amount needed
- However, any time MRP sees an order for more than this quantity, it creates an action message

Ord Mult. The multiple in which orders for this item are placed

- Used only when Order Policy is POQ or LFL
  - Then MRP uses it to determine the quantity of planned orders
  - The net requirement is rounded up to a multiple of this number

Example If the order multiple is 50 and the net requirement is 432, MRP creates a planned order for 450.

Yield%. The percentage of any order expected to be in usable condition

- Applies to both purchased and manufactured items
- If the yield is less than 100%, then MRP plans orders for more than needed

Example If the net requirement is 100 and the item yield is 50% then the planned order quantity is set to 200.

Run Time. Standard time in decimal hours (excluding setup time) required to make one unit of this item

- The sum of all the operation run times
- This field is for reference only and may appear on some selected reports and inquiries

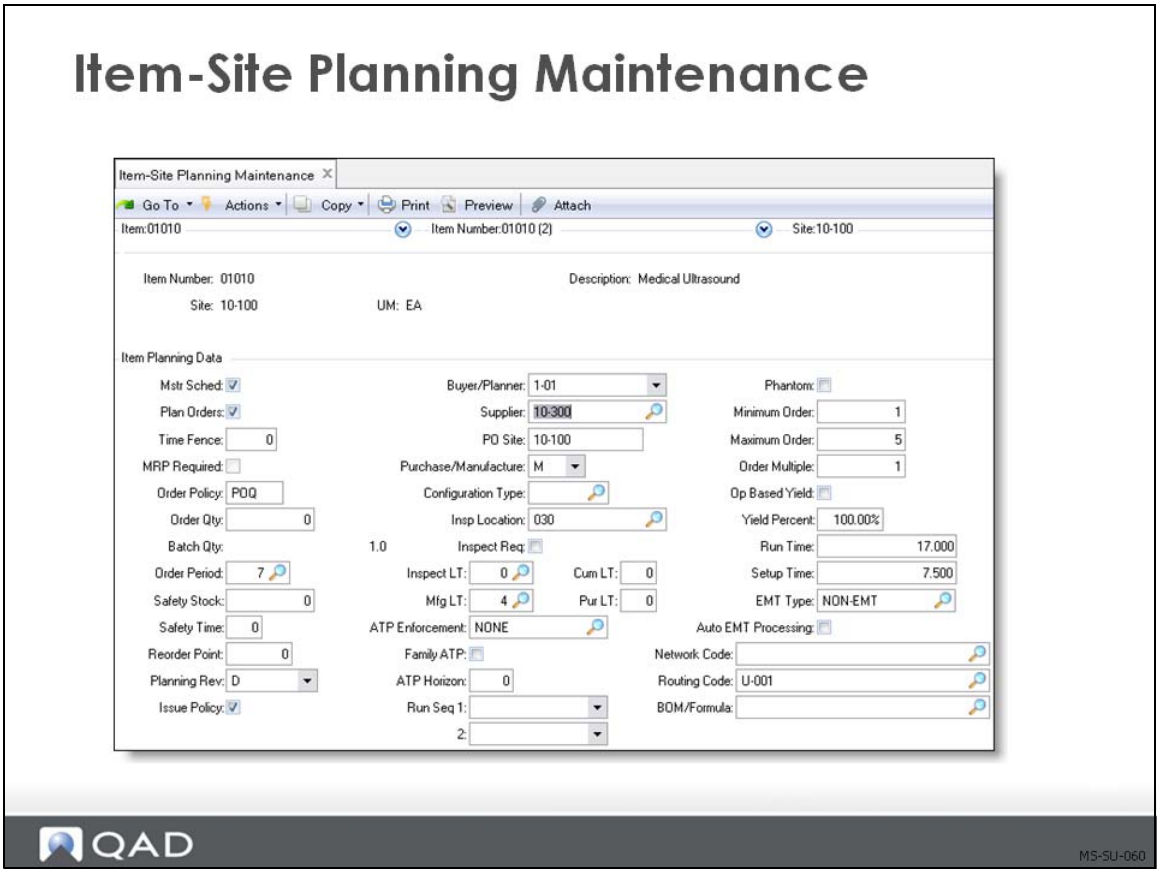
Setup Time. Standard time required in decimal hours to set up for one lot of this item

- The sum of all the operation setup times divided by the item Order Quantity
- This field is for reference only and may appear on some selected reports and inquiries

EMT Type. This field is used in the Enterprise Material Transfer (EMT) order processing environment.

Auto EMT Processing. This field is used in the multilevel Enterprise Material Transfer (EMT) order processing environment.

Item-Site Planning Maintenance



Multisite Environments

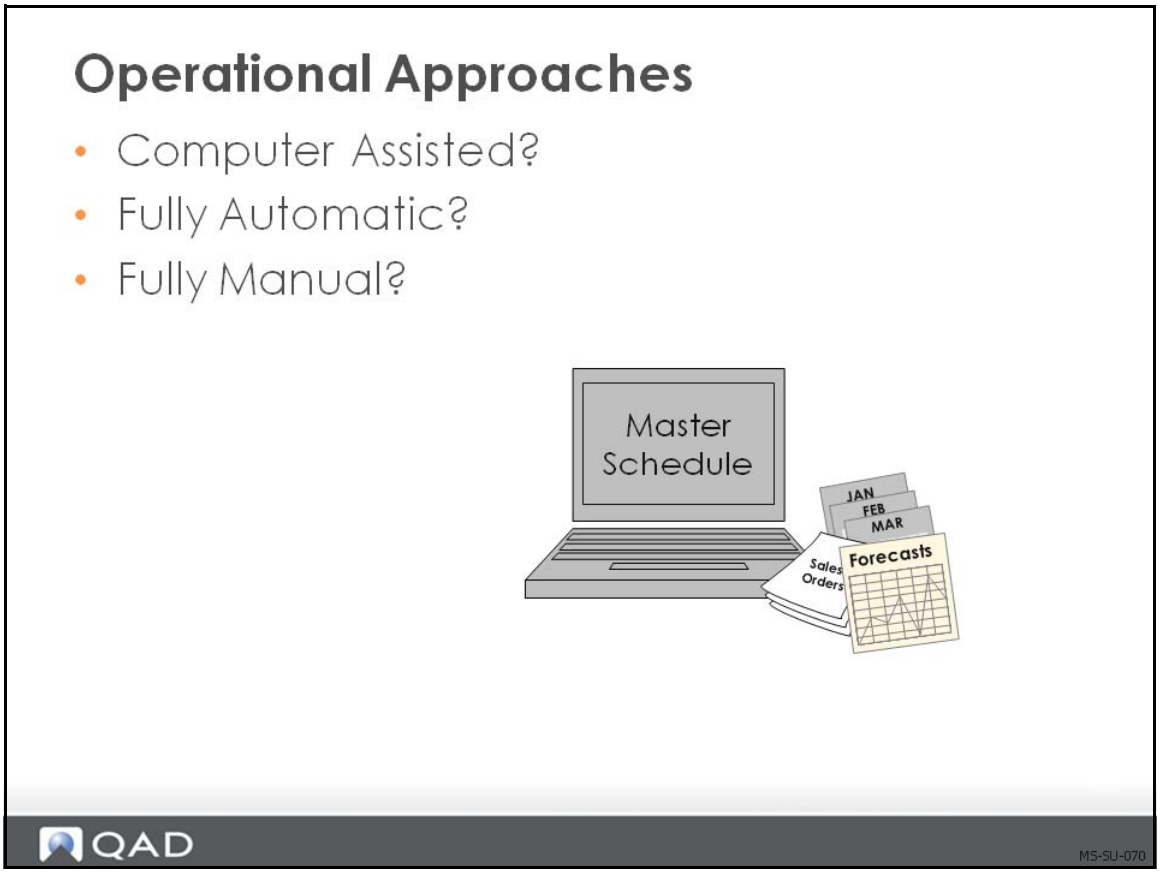
Note Takes precedence over Item Planning Maintenance (1.4.7).

Item planning data controls QAD Enterprise Applications planning and manufacturing functions. If an item is used at multiple sites, planning data can be set up differently for each site.

If an item is used at multiple sites, planning data can be set up differently for each site.

- To define an item as master scheduled, set Master Schedule to Yes in Item-Site Planning Maintenance (1.4.17)
- An item can be master scheduled at one site and not at another

Approaches to Master Scheduling



There are three approaches to master scheduling in QAD Enterprise Applications:

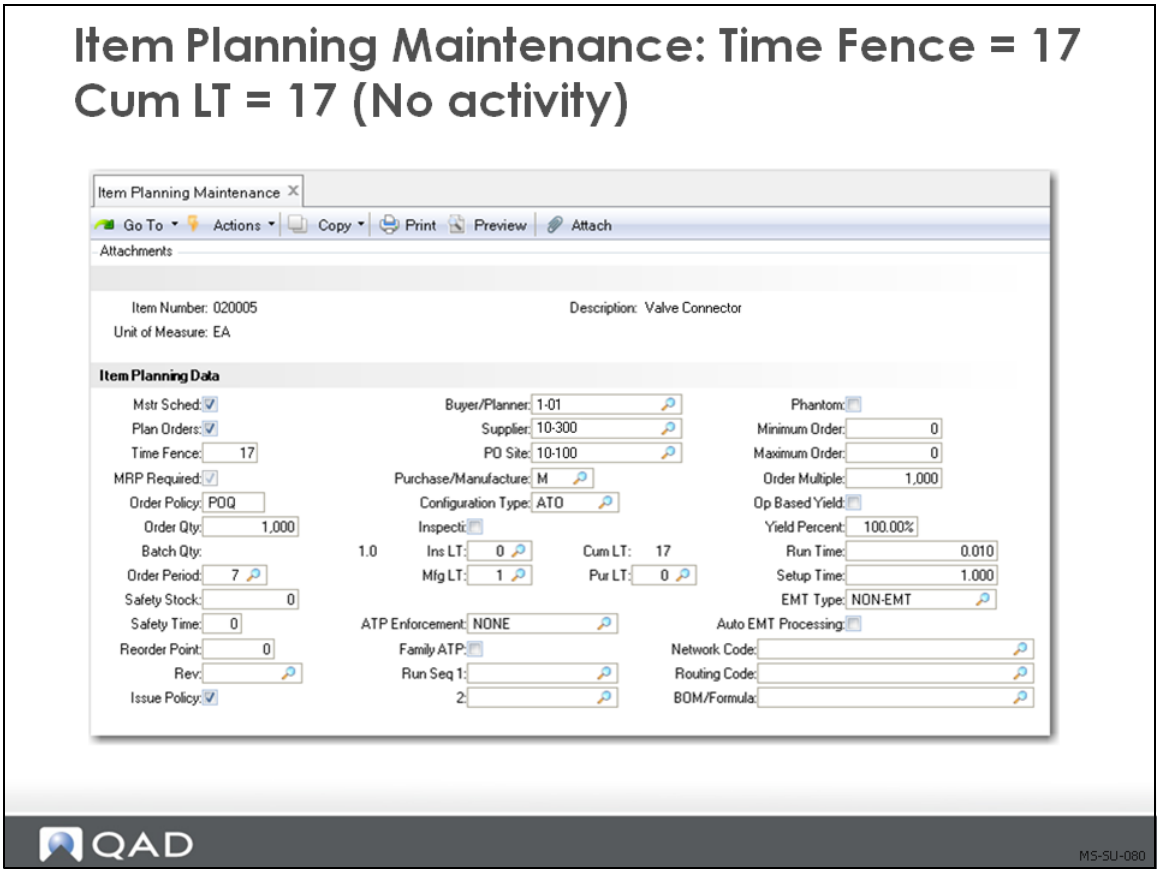
1 Computer assisted (recommended)

2 Fully automatic

3 Fully manual

Carefully consider these options when setting planning parameters for your items at each site. Each item can be set up in any of these approaches. The next few pages will discuss the options in some detail.

Computer Assisted Approach (Recommended)



To use the computer-assisted approach for master scheduling, set the following values for each master scheduled item:

- Master Schedule is Yes
- Plan Orders is Yes
- Time Fence is cumulative lead time
- Order Policy is any option but blank

  Time Fence. Defining time fences for master scheduled items allows MRP to control orders outside of a specified time period and allows the master scheduler to control orders within that time period.

  Specify a planning horizon, in calendar days, for each master scheduled item. When MRP plans orders for these items, it will not schedule order due dates within this time fence.

MRP will plan orders to:

- Cover future requirements
- Provide action messages over the near-term horizon
  - In the near term, the master scheduler maintains the master schedule

Note The time fence is where manual control is exerted in computer-assisted planning. The longer the time fence the more manual involvement the master scheduler will have.

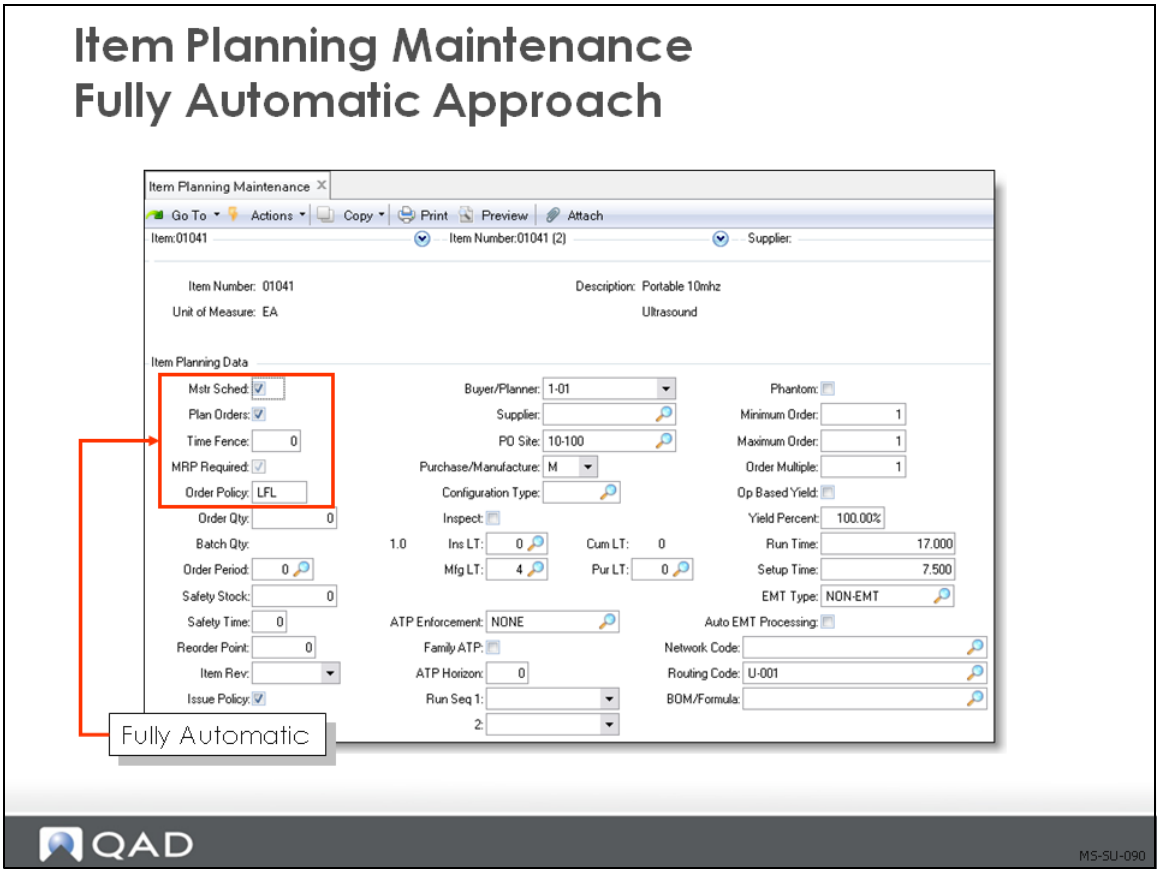
Selective Materials Plan

Selective Materials Plan (23.3) allows planning for master scheduled items separately from MRP items. If you use the computer-assisted approach to master scheduling, you may want to:

- Run Selective Materials Plan for master schedule items only
- Adjust the master schedule and rerun Selective Materials Plan as needed
- Run Selective Materials Plan for MRP-scheduled items only

Note Selective MRP plans requirements only for the items selected. At some point you will need to run Net Change MRP to plan lower level requirements.

Fully Automatic Approach

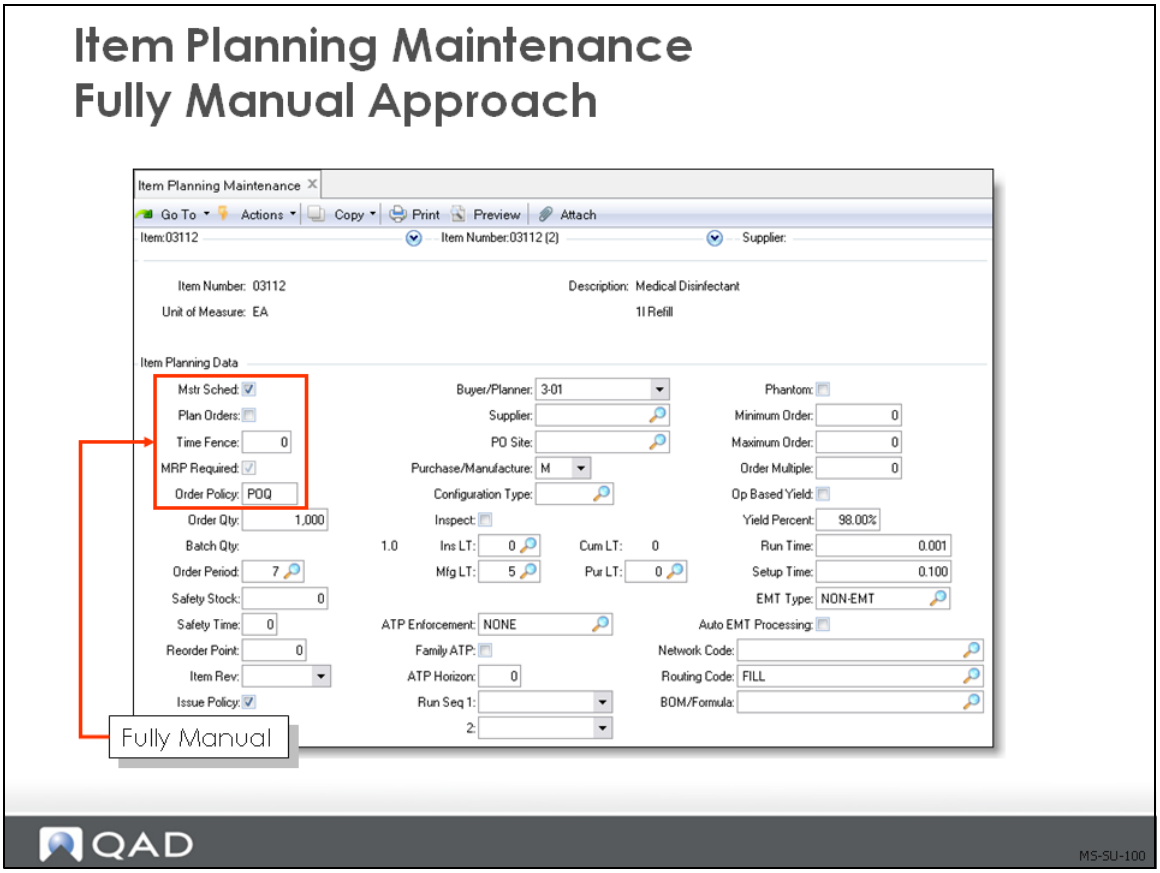


The master schedule can be generated entirely by MRP. This means that the system has complete control over master scheduled items with no distinction between master scheduled and MRP items. When this approach is used, material plans may change dramatically each time MRP is run. A master schedule order may be expedited one day and canceled the next for example.

To use the fully automatic approach to master scheduled items, set the following values:

- Master Schedule is Yes
- Plan Orders is Yes
- Time Fence is 0
- Order Policy is any option but blank

Fully Manual Approach



Fully Manual Scheduling

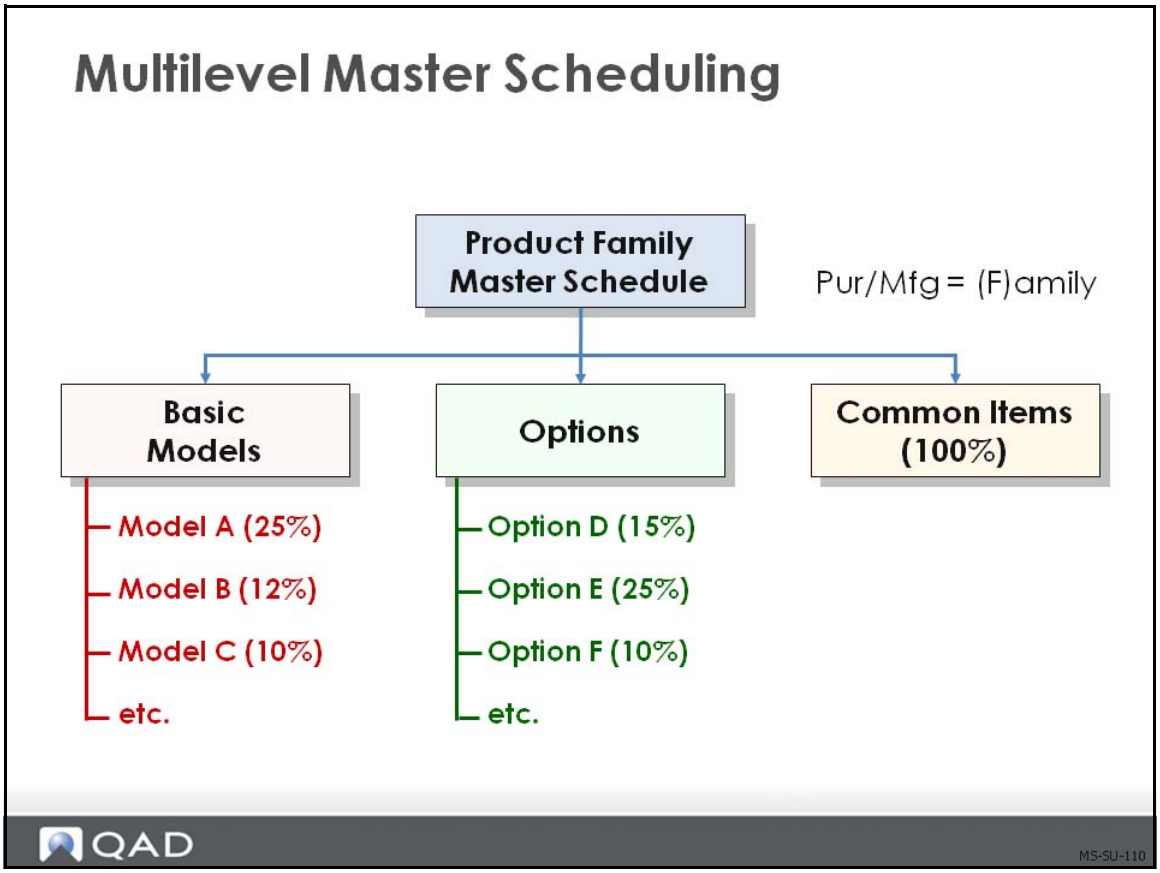
- Master Schedule is Yes
- Plan Orders is No
- Order Policy is Any option other than blank

Enter all master scheduled orders manually. MRP will not generate any planned orders, but will issue action messages suggesting that orders be created if none exist.

Note In a make-to-stock environment it seems unlikely that all master scheduled items would be planned manually. However in a make to order environment it is more likely and in a job shop situation very likely.

There are situations where the master scheduler wants to know the requirement for an item but does not want the system to plan an order that will never be released. One example of this is water used in some food processing. The planner may want to know how much water this months schedule requires, but will never issue a purchase order to buy the water as it is cover by plant overhead as a utility. The action message will specify the amount of water needed. In contrast some processes used specially processed bottled water that is purchased with a purchase order.

Multilevel Master Scheduling



- Plan family-level items using either the fully automatic or computer-assisted technique
- Use MRP to plan orders to generate production forecasts for the components of family items

Sometimes, demand for an item is dependent on demand for another item. This is a common occurrence when the master schedules for several sets of items are related through planning bills or product structures.

- Typical in assemble-to-order environments such as automotive or computer manufacturers
- Unrealistic to stock all of the possible combinations of end items
- Impossible to accurately forecast all possible combinations of end items for master scheduling

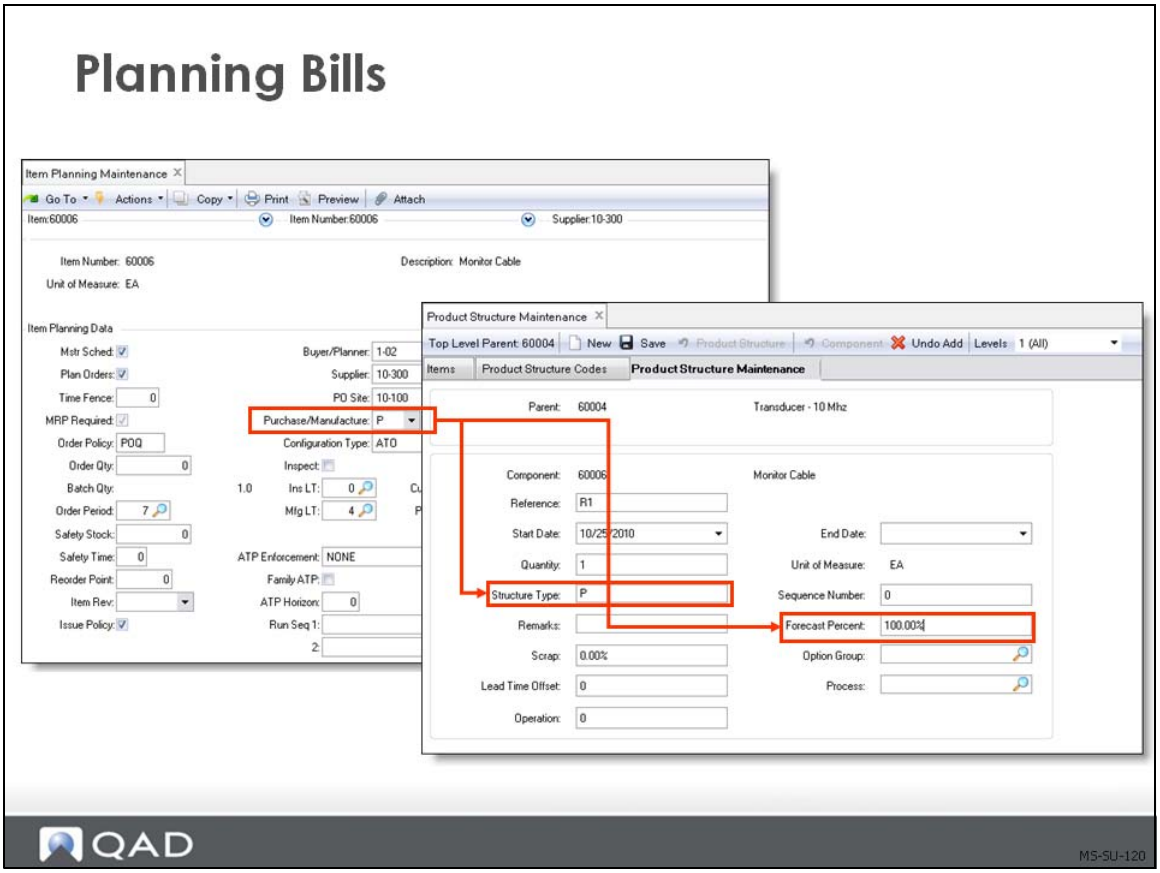
For master scheduling purposes, it is not possible to accurately forecast the detailed combinations of potential products that can be manufactured and sold.

Forecasting at the family-item level or the option-item level is more accurate and can be used to drive the master schedule process.

Typically, the top-level item of a multilevel master scheduled product structure represents the family of buildable products that can be configured from a set of available models and options. It represents an item that is itself never manufactured or stocked.

In QAD Enterprise Applications, such an item is assigned the Pur/Mfg code of F (family).

Planning Bills



Having identified a family item for multilevel master scheduling, the next step is to identify the component items. In such a product structure the components are the actual:

- Manufactured model
- Manufactured configured product
- Item groups representing common parts or selected options

Using Product Structure Maintenance in QAD Enterprise Applications, items within the family product structure are assigned a:

- Structure code of P (planning) or O (option)
- Forecast percentage

The Structure Code settings of P or O dictate how QAD Enterprise Applications will handle the dependent demand forecast driven off of the parent item.

Production Forecasts

As a result of establishing a family planning structure and then forecasting and master scheduling at the family level, QAD Enterprise Applications will calculate the demand for the component items. This derived demand resulting from the family or upper-level independent demand is a Production Forecast.

- The production forecast derives from the:
  - Master production schedule, and
  - Forecast percentage specified in the planning bill
- Production forecast amounts:
  - Display in master schedule reports and inquiries
  - Contribute to the total demand that MRP regards as input

When planning bills, forecasts and master schedules are established at the family-item level,

QAD Enterprise Applications automatically calculates the derived demand for components of the family or upper-level item.

These calculations are based on the available-to-promise quantities for the family-level item and the quantity per and forecast percentage for the components of that family item.

As forecast for the family-level item is consumed, the available net forecast for that item changes, resulting in revised calculations for the production forecast the next time MRP is run.

Top-Level Items

Usually, the top-level item of a multilevel master scheduled product structure or planning bill represents the entire family of products that can be configured from a set of available models and options.

- Define family items with a Pur/Mfg code of Family (F) in Item Planning Maintenance (1.4.7) or Item-Site Planning Maintenance (1.4.17)
- Components of the family item in the planning bill can be either:
  - The actual manufactured items or configured products, or
  - Item groups representing common components or selected options

Family-Level Item Values

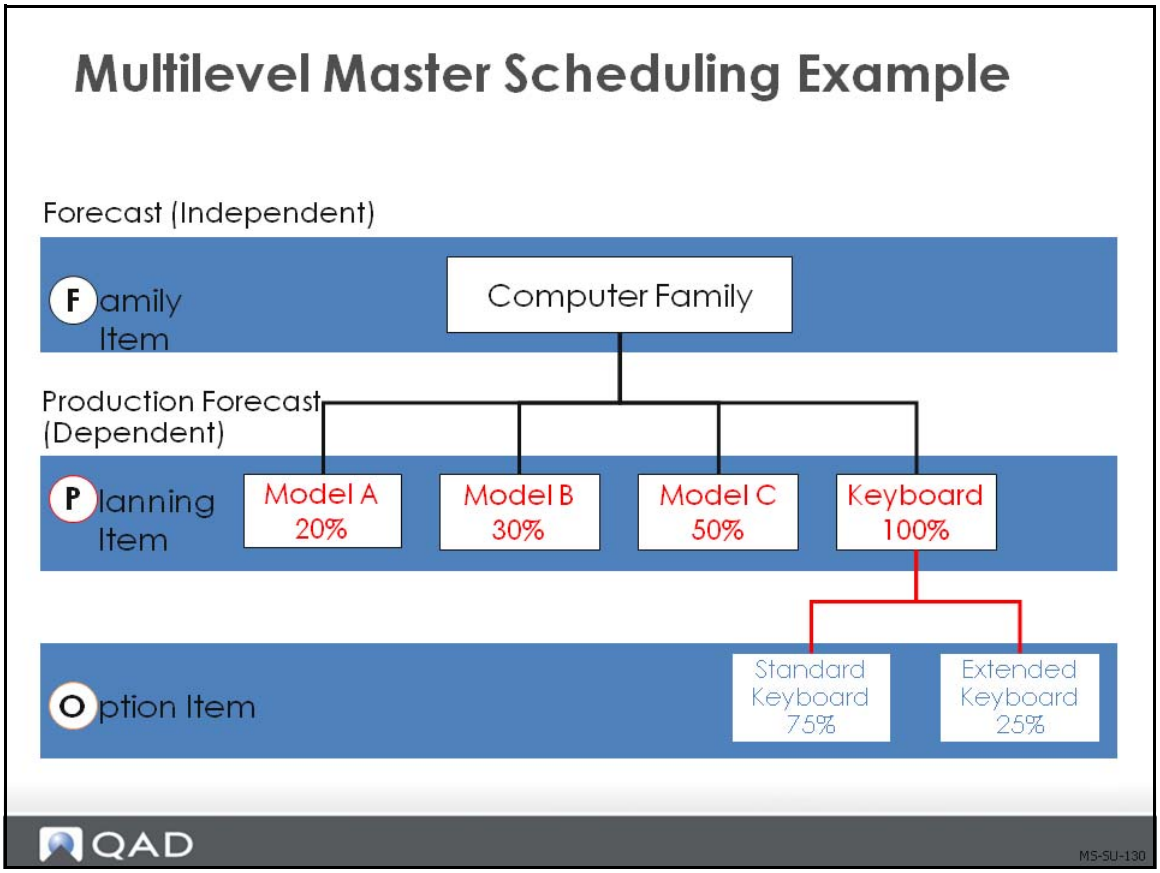
Set Master Schedule to Yes and Plan Orders to Yes for family-level items.

- MRP calculates net requirements and creates or adjusts planned orders accordingly
- Manually control the schedule for a period of time by setting the time fence appropriately

  Time Fence (Optional). MRP adds the time fence to the system date
  - MRP does not create any planned orders within that time period
  - MRP will delete any planned order if there is no demand generated for the item
  - If change is needed on firm orders, MRP creates an action message

  Order Policy. Any option other than blank

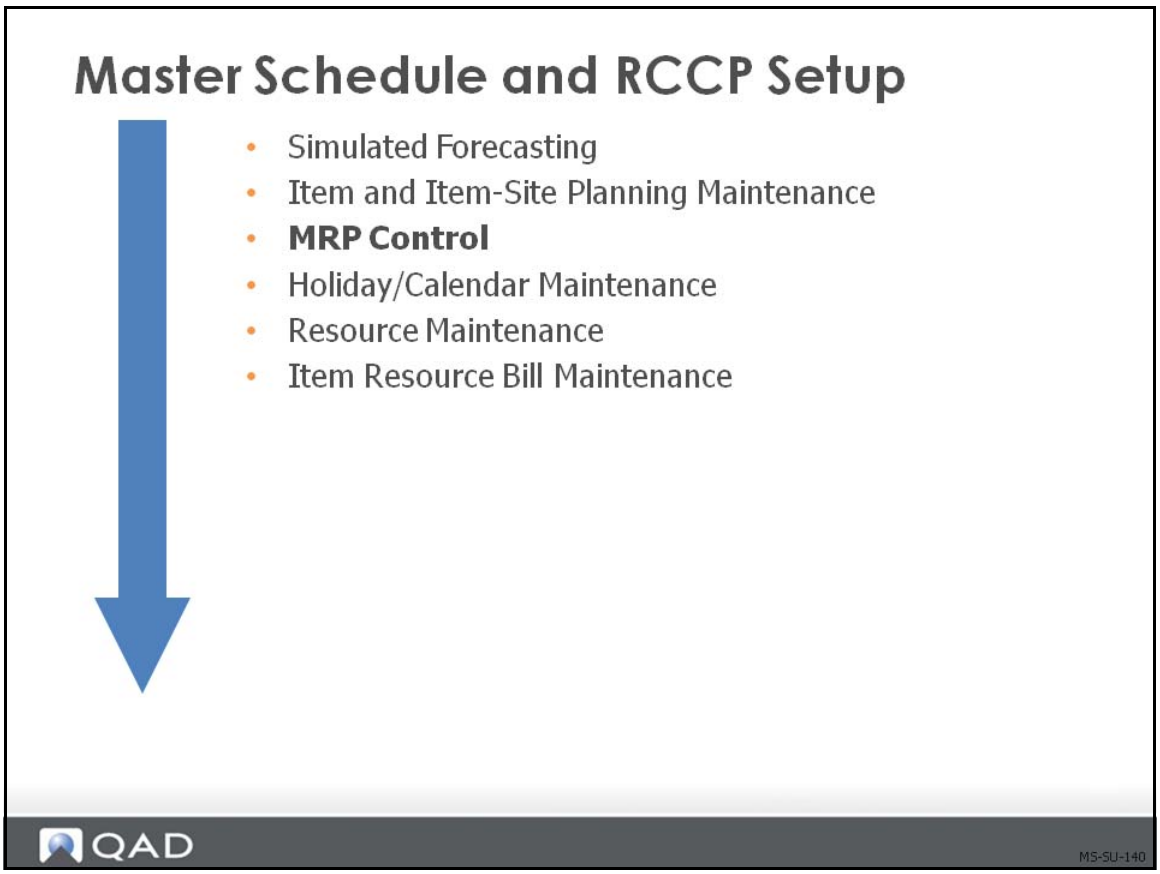
Example

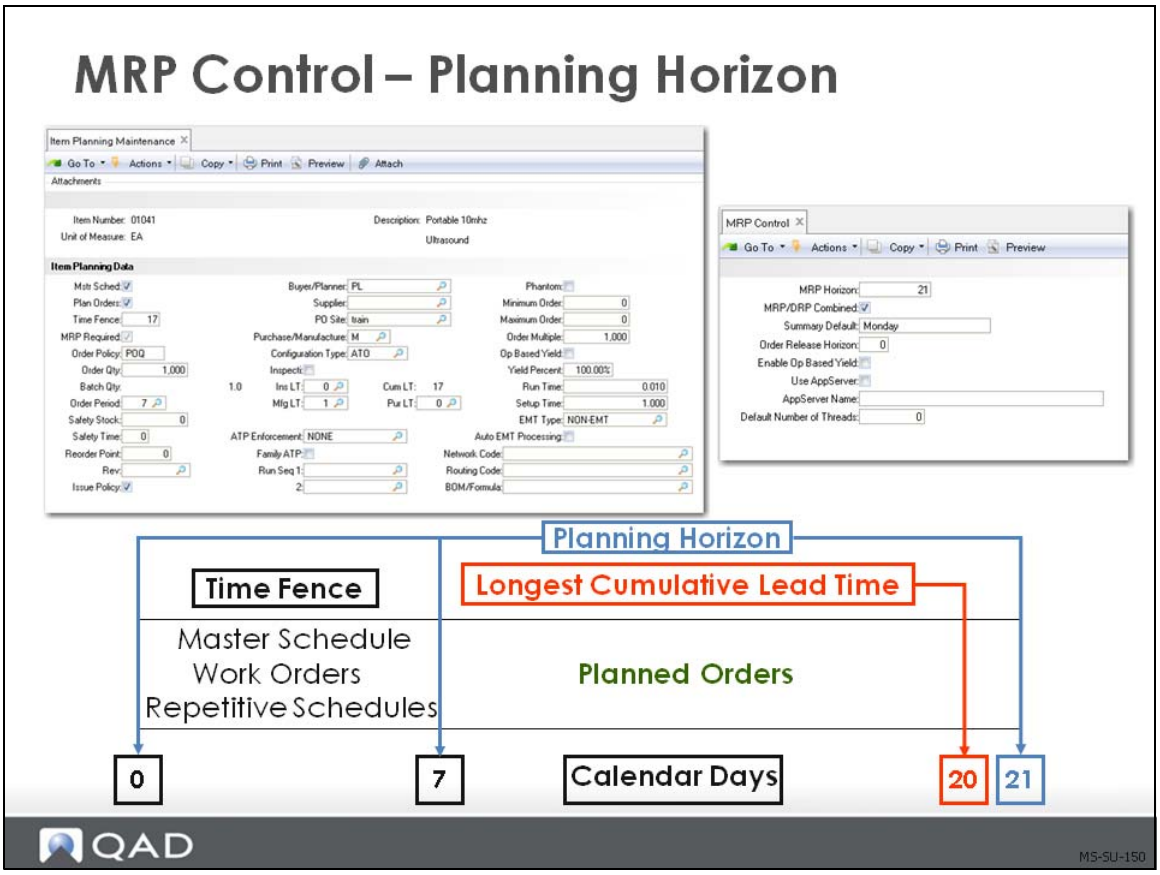


The multilevel schedule consists of forecasts that are exploded by MRP.

Note Discussed in *Training Guide: Product Structures and Formulas.*

MRP Control


Master Schedule and RCCP Setup
Simulated Forecasting
Item and Item-Site Planning Maintenance
MRP Control
Holiday/Calendar Maintenance
Resource Maintenance
Item Resource Bill Maintenance
QAD
MS-SU-140



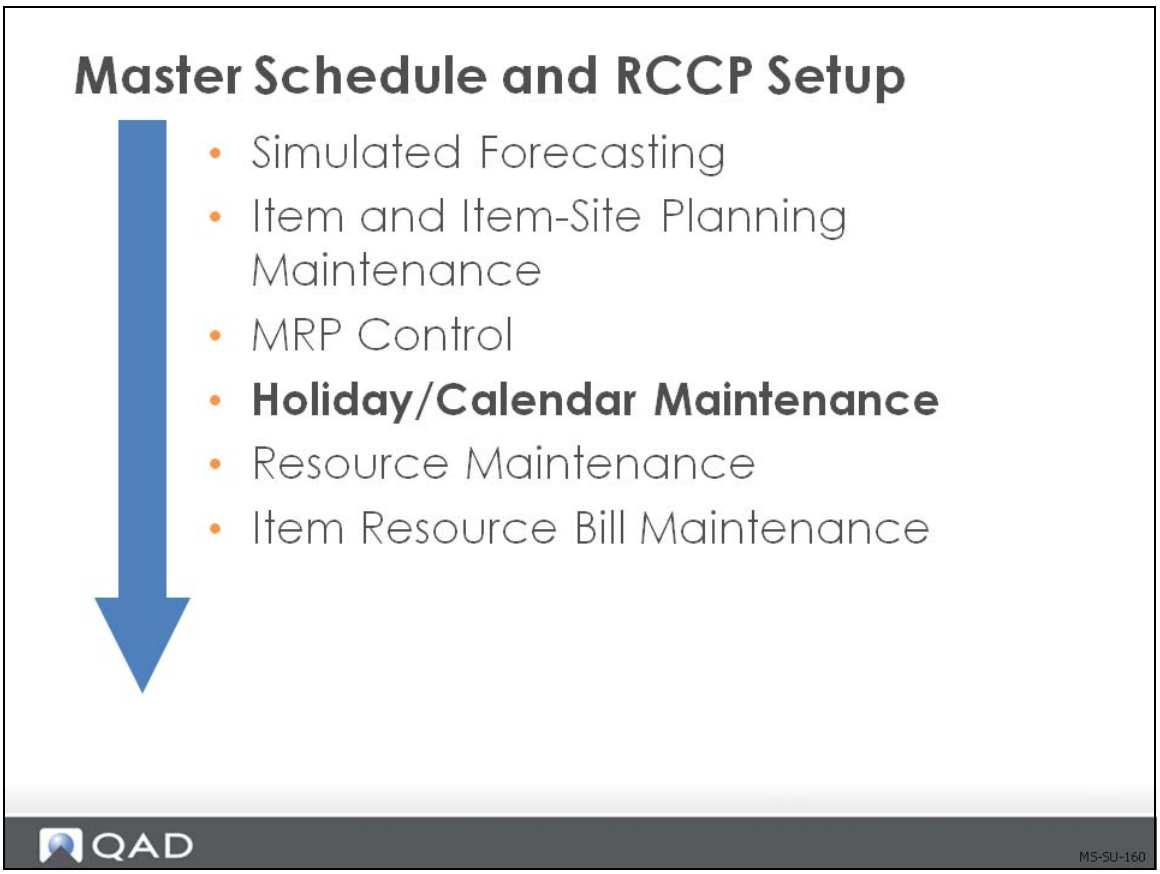
Time Fence. Number of calendar days from the system date inside of which MRP will not create or change existing planned orders. Order action messages, however, will be generated if necessary. The time fence is where manual control is exerted in computer-assisted master scheduling

MRP Horizon. The MRP horizon should be at least as long as the master scheduled item with the longest cumulative lead time for the item being scheduled or else key materials may not be planned to be available when required. MRP only processes material requirements within this planning horizon

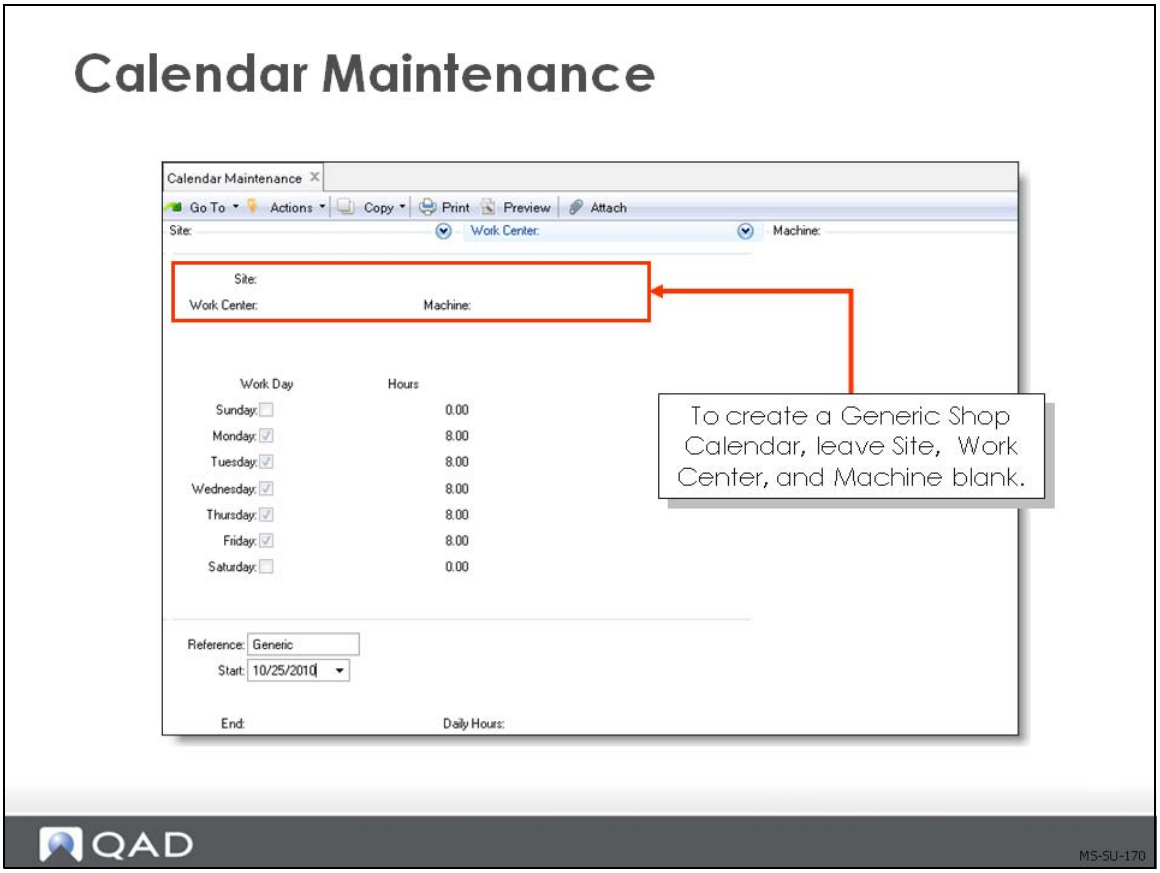
Order Release Horizon. Order Release Horizon is the number of days MRP looks to the future to see when orders are due to be released. In the screen shot the value is seven days. MRP will start creating action messages “order due for release” seven days before the release date.

Warning If the horizon is changed, items are not automatically flagged for net change replanning. Run Regenerate Materials Plan (23.2).

Holiday/Calendar Maintenance



Calendar Maintenance



Calendar Maintenance (36.2.5) is only relevant for master scheduling when using the fully automatic or computer-assisted method.

- Calendars define:
  - The standard work week for a site and the work centers in it
  - Exceptions to the normal calendar, such as scheduled overtime or shutdown periods
- In a calendar, work days = Yes and nonwork days = No

Note If the Site, Work Center, and Machine are blank, the calendar acts as the default for the entire company (must be blank for RCCP.)

Manufacturing order due dates are scheduled only on work days. Each work day has a production capacity in hours, excluding breaks and non-productive time. Manufacturing operations can only be scheduled up to the production capacity of the day.

You can specify exceptions for overtime or machine downtime. This information is used only when operation schedules are prepared, not when calculating manufacturing order due dates. When a discrepancy occurs, you may have to adjust the due date.

To implement shop calendars correctly:

- Create a calendar with Site, Work Center, and Machine left blank. This is the system calendar
- Create a calendar for each site with the Work Center and Machine left blank. This is the calendar used by CRP to calculate capacity, including holidays

- Create Work Center calendars with site and work center filled in

QAD Enterprise Applications looks first for a calendar for the specific site, work center, machine combination.

- If none is found, it looks for a match on Site and Work Center with Machine Blank
- If none is found, it looks for a match on Site with both Work Center and Machine Blank
- If none is found, it looks for a default calendar with Site, Work Center, Machine Blank

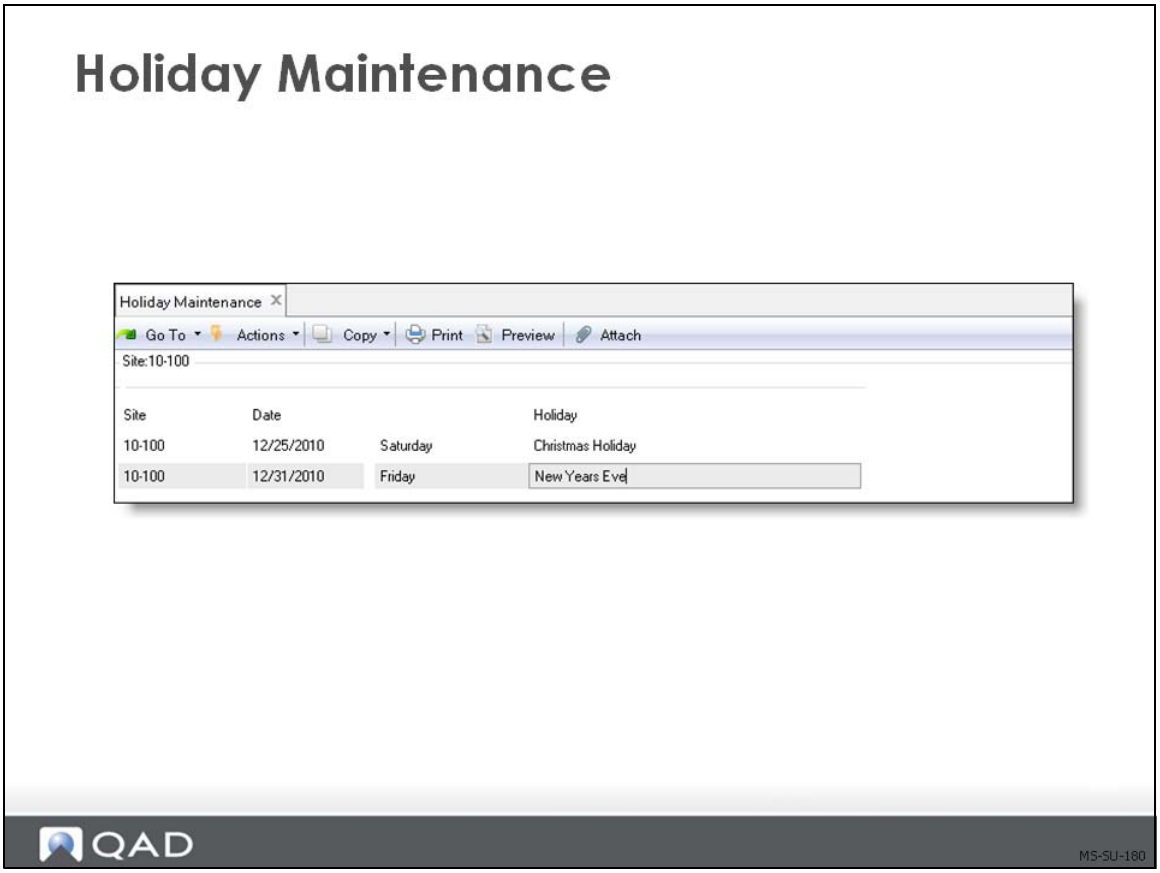
To schedule exceptions, enter the Reference and specify the number of hours per day (positive for overtime, negative for downtime or holidays).

Example If you normally work 8 hours a day, enter -8 hours for a shutdown date.

Use Start and End dates to schedule multiple days of overtime or downtime.

Warning When scheduling overtime, you could schedule a non-work day. When scheduling downtime, each of the days from Start through End must have at least this number of hours normally scheduled, or you could end up with a negative production capacity on those days.

Holiday Maintenance

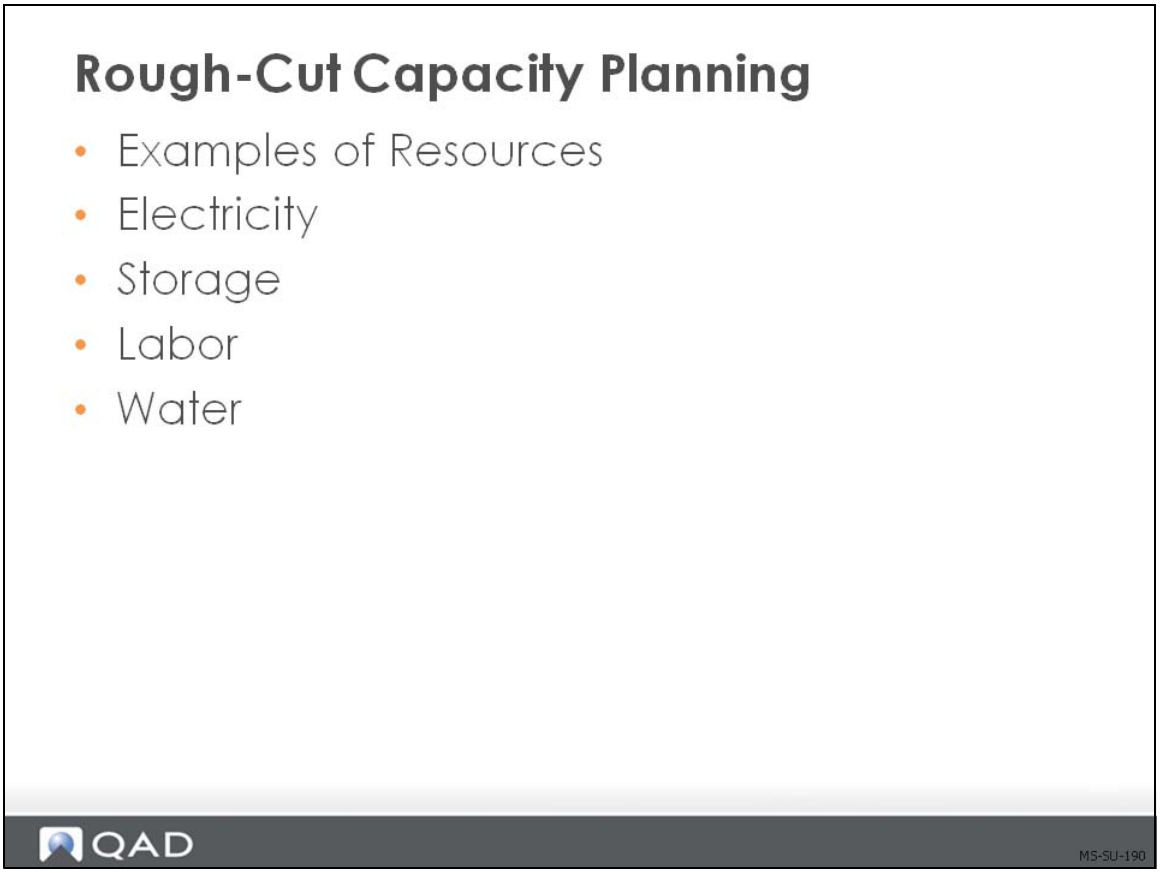


Holidays are days that no one works; the plant is shut down and no production is scheduled. Holidays can be different at each site.

Manufacturing orders are never due and operations are never scheduled on a holiday (you can override this if necessary.)

If a holiday does not apply to all work centers, it isn't a holiday. It is an exception to the normal shop calendar. Exceptions are entered using Calendar Maintenance (36.2.5), recording the day off only for the work centers to which it applies.

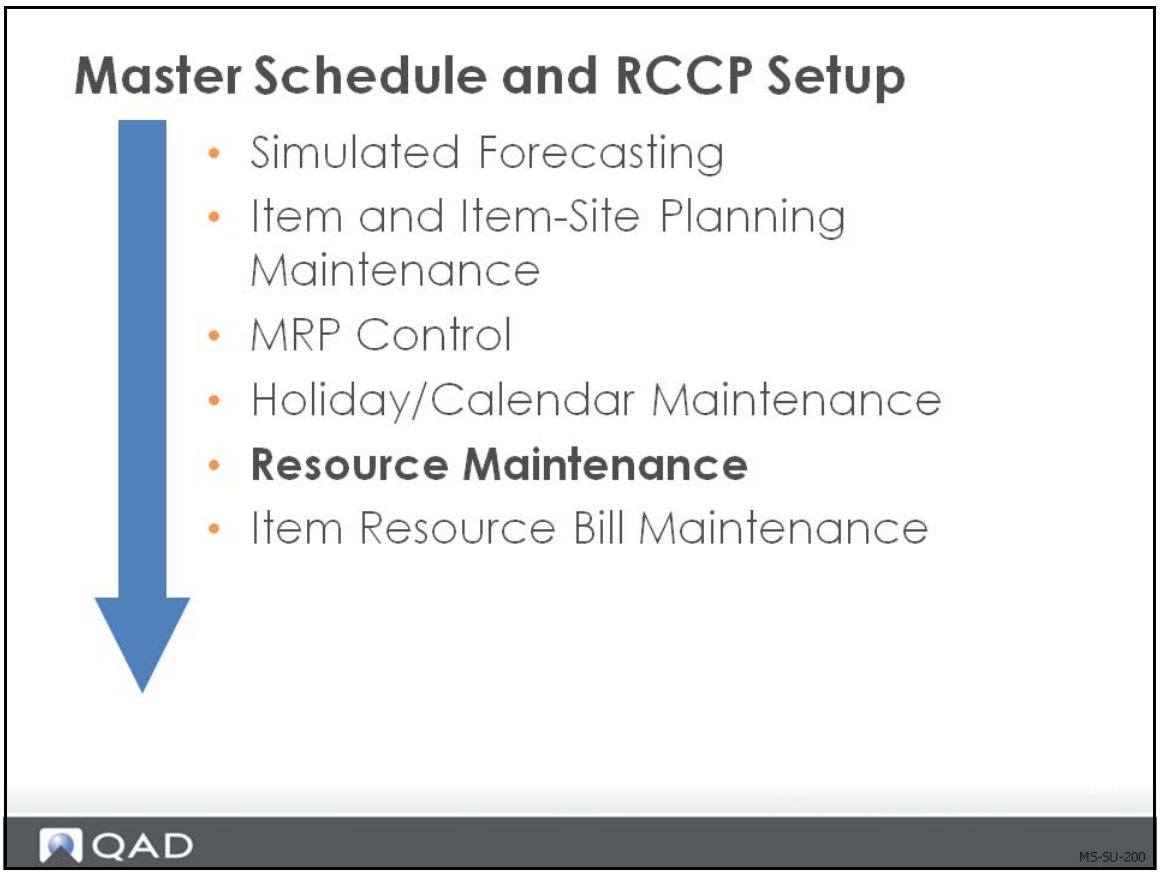
Rough-Cut Capacity Planning



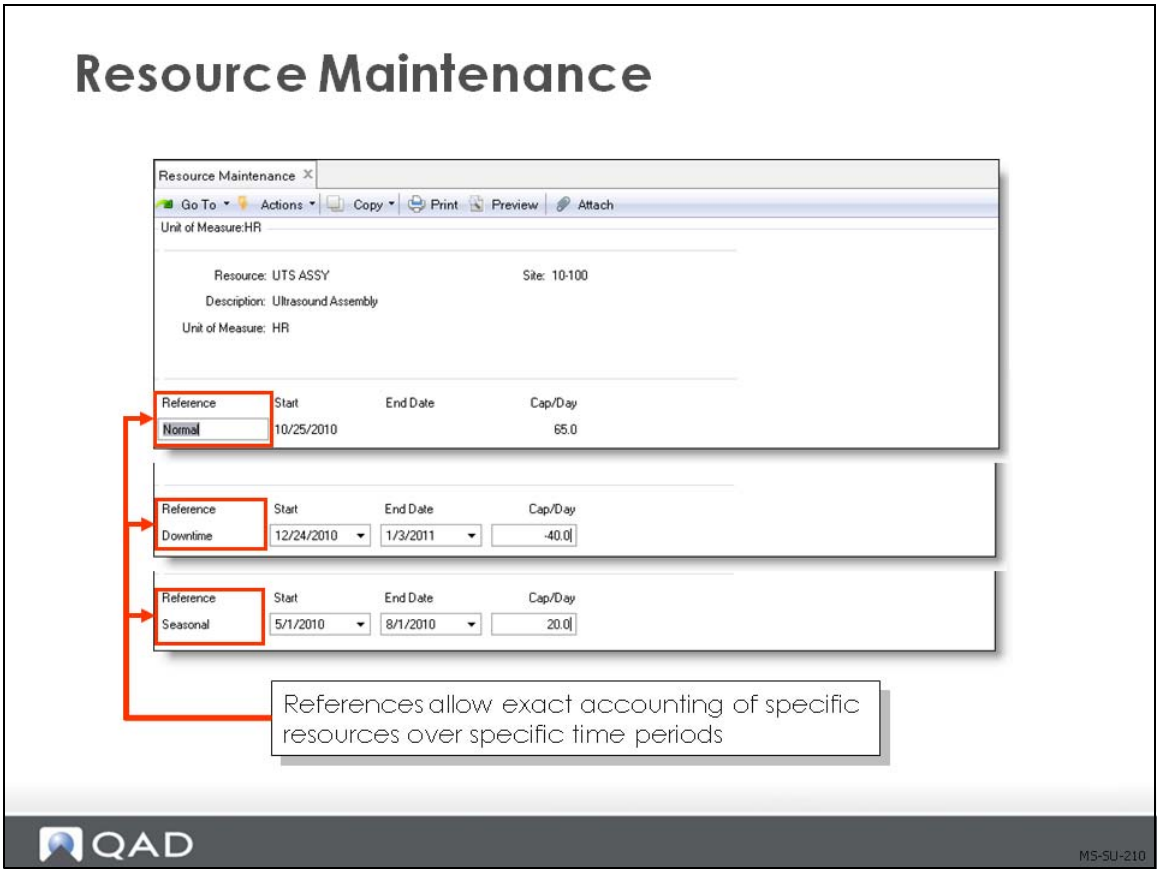
Rough-cut capacity planning:

- Shows consumption of critical resources
- Enables master schedulers to:
  - Test end-item production plans
  - Calculate capacity to meet the master schedule
  - Compare and modify required and planned capacity
  - Analyze load on key resources by time period
  - Isolate and resolve potential problems

Resource Maintenance



Resource Maintenance



Resources must be defined before you can evaluate resource load.

Product line planning, master scheduling, and operations planning activities are feasible only if key resources are available. Rough-cut resource planning is usually done prior to committing production resources to a plan.

First, identify the resources in your company that are bottlenecks or can't be easily increased in the short term. These are your key resources. Examples of key resources include specialized labor, special machinery, and cash.

Define key resources in Resource Maintenance (21.1), then set up resource bills for:

- Individual product lines in PL Resource Bill Maintenance (21.5)
- Items in Item Resource Bill Maintenance (21.17)

Load Profiles

Resource bills (also called load profiles) help you compare the resource capacity needed for production against the available capacity. If you need more of any resource than you have available, you must change the plan or increase the resource capacity.

Resource capacity changes over time. For example, another machine or shift is added, or downtime and holidays are scheduled. These changes are recorded with a reference code, start date and end date.

Cap/Day can be positive or negative. If the normal capacity for a resource is 100 hours per day, and you are planning a shutdown on May 10 and 11, you would enter it as:

- Reference [Shutdown]
- Start Date [May 10]
- End Date [May 11] and
- Cap/Day [-100]

A resource's capacity on a specific date is the cumulative capacity from the references that are in effect on that date.

Description. A short description of this resource that prints on reports and inquiries, as space permits

The lookup on the Resource field displays the resource codes and descriptions. You can search through this window in sequence by either field or description. This may influence how you set up your descriptions. For example, you may choose to make the first few characters or words significant for searching purposes.

Reference. This optional code identifies a level of resource capacity, such as:

- Normal
- Vacation
- Shutdown

If you use Enterprise Ops Plan, you can access the capacity information for this time period on item resource bills that reference this code. Otherwise, the reference merely describes the resource capacity level for the specified time period.

The capacity of each resource is stated in terms of an average level per day over a certain time period. The capacity may change, perhaps for vacation plant shutdowns or adding a second shift. These capacity changes are identified by reference. The total capacity on any given day is the sum of the capacity components effective on that day.

Example A machine resource has the following capacity levels:

- NORMAL Jan 1 to Dec 31 7 hrs/day
- SHUTDOWN Aug 1 to Aug 31 -7 hrs/day
- 2nd SHIFT Oct 1 to Dec 31 7 hrs/day

The total capacity on August 15th is zero, while the total capacity on October 15th is 14 hours per day.

Key Resource

A single resource can consist of multiple positive or negative dated components.

RCCP tests resources that may limit production of an item's schedule:

- Skilled labor hours
- Production line quantities per hour
- Inspection or testing hours
- Scheduled losses of resource capacity
  - Overlapping vacations

- Equipment replacement

Components of a Resource

- Each key resource is defined separately in QAD Enterprise Applications
  - Available in different quantities at different times of the year
- Normal resource quantities are entered as primary resource references or components
- Additional references include the amount by which they add to or subtract from capacity

Example In a firm where five specialized fabricators (such as aluminum welders) are employed, the resource is defined in welder hours. The first component could be defined as the hours that the five employees provide in capacity per day (5 welders x 7 hours = 35 hours/day).

Adding Time-Phased Changes

Additional references can be added for employee's vacations that reduce capacity

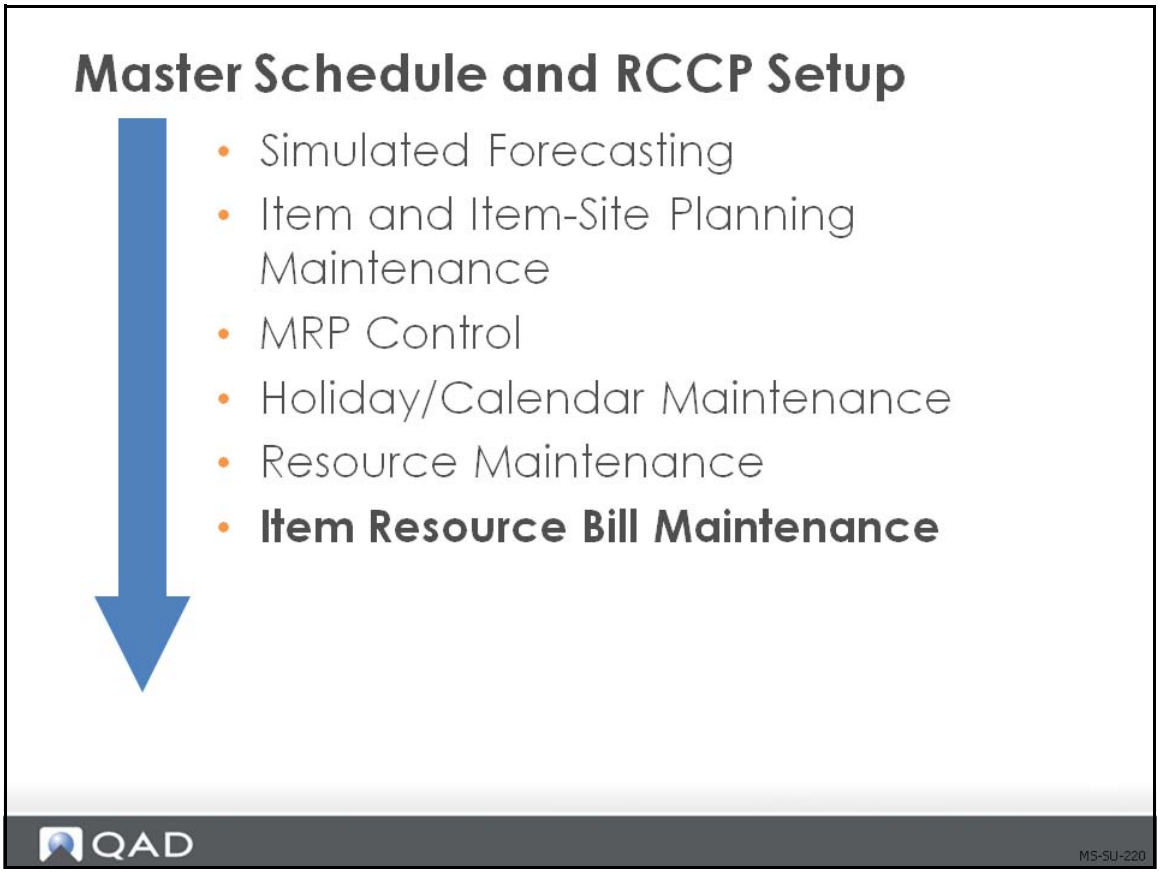
- BobV –7.0 hours, July 1 to July 10

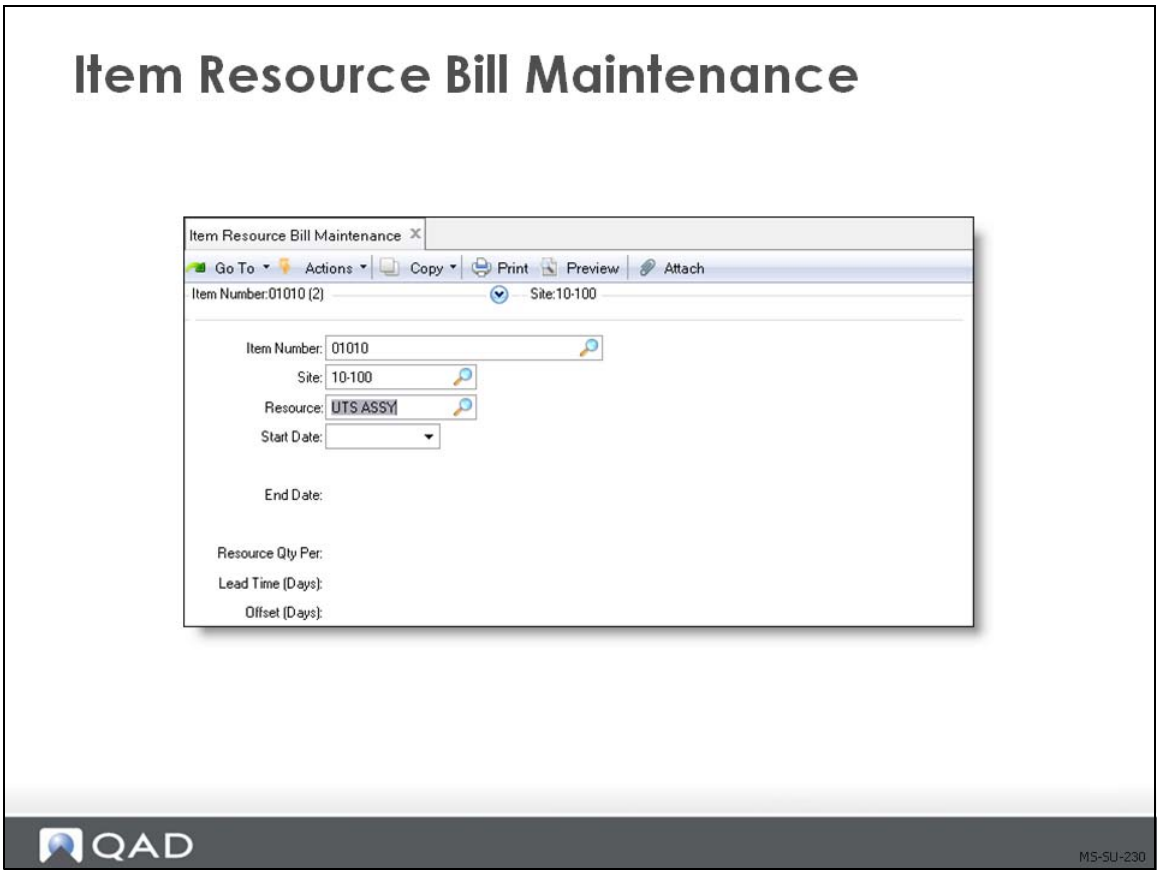
Periods of scheduled overtime will increase capacity

- OT 20 hours, September 15 to October 15

When the resource is tested against scheduled production, the system calculates the available resource quantity using these dates and the shop floor calendar.

Item Resource Bill Maintenance





Item resource bills are used only to evaluate the manufacturing schedule. Item Resource Bill Maintenance (21.17) records information on resource requirements for individual items.

Manufacturing schedules are feasible only if key resources are available. Rough-cut capacity planning verifies resource availability prior to committing production resources. An item resource bill (or load profile) specifies the amount of a resource required to make one unit of the item. The resource amount is expressed in the resource unit of measure such as tons or hours.

Example To produce a case of ice cream, a blending machine processes 36 kilos of vanilla cream. In the resource record for the blending machine, capacity is expressed in metric tons. Therefore, the resource quantity per for the ice cream item resource bill is 0.036 tons.

The resource bill also determines when and for how long the resource is required.

Lead Time (Days) . Identifies the number of production days the resource is required

Offset (Days). Identifies how many days in advance of production the resource is required

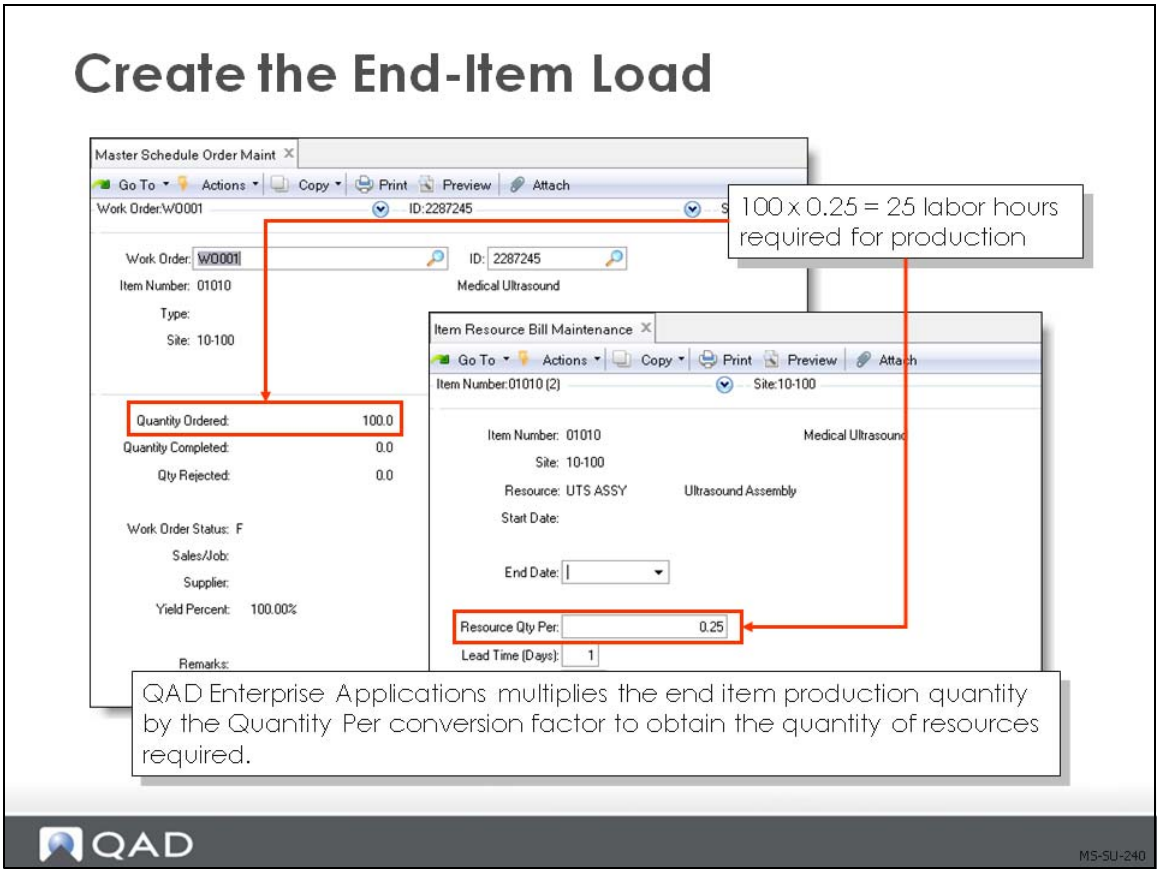
For the ice cream, the blending machine is used for one work day, but the order for the ice cream must be released two days in advance of the requirement.

Note Lead time must always be at least 1 (if zero, no load will be calculated).

Review Item Resource Load Summary Report (21.22) and Item Resource Load Detail Report (21.24, 21.48 in Enterprise Edition .NET UI) before committing resources to the production plan.

If you need more of any resource than you have available, you must either change the plan or increase the capacity of the resource.

Creating the End-Item Load



QAD Enterprise Applications multiplies the end item production quantity by the Quantity Per conversion factor to obtain the quantity of resources required.

- Master Schedule Order Maintenance (22.13)
- Item Resource Bill Maintenance (21.17)

Production Conversion Factor

To see exactly how much of a certain resource is required by a scheduled production quantity, the production must be measured in resource units—typically hours or items per day. To do this in QAD Enterprise Applications, determine a conversion factor and enter it in the Resource Qty Per field in Item Resource Bill Maintenance (21.17).

Example To convert production schedules into resource units for RCCP, determine how many hours (or other units) it takes to create a single scheduled end item. If it takes 1.3 hours to complete one end item, the conversion is 1.3. To make 100 end items for the scheduled item, it would take 100 x 1.3 = 130 hours.

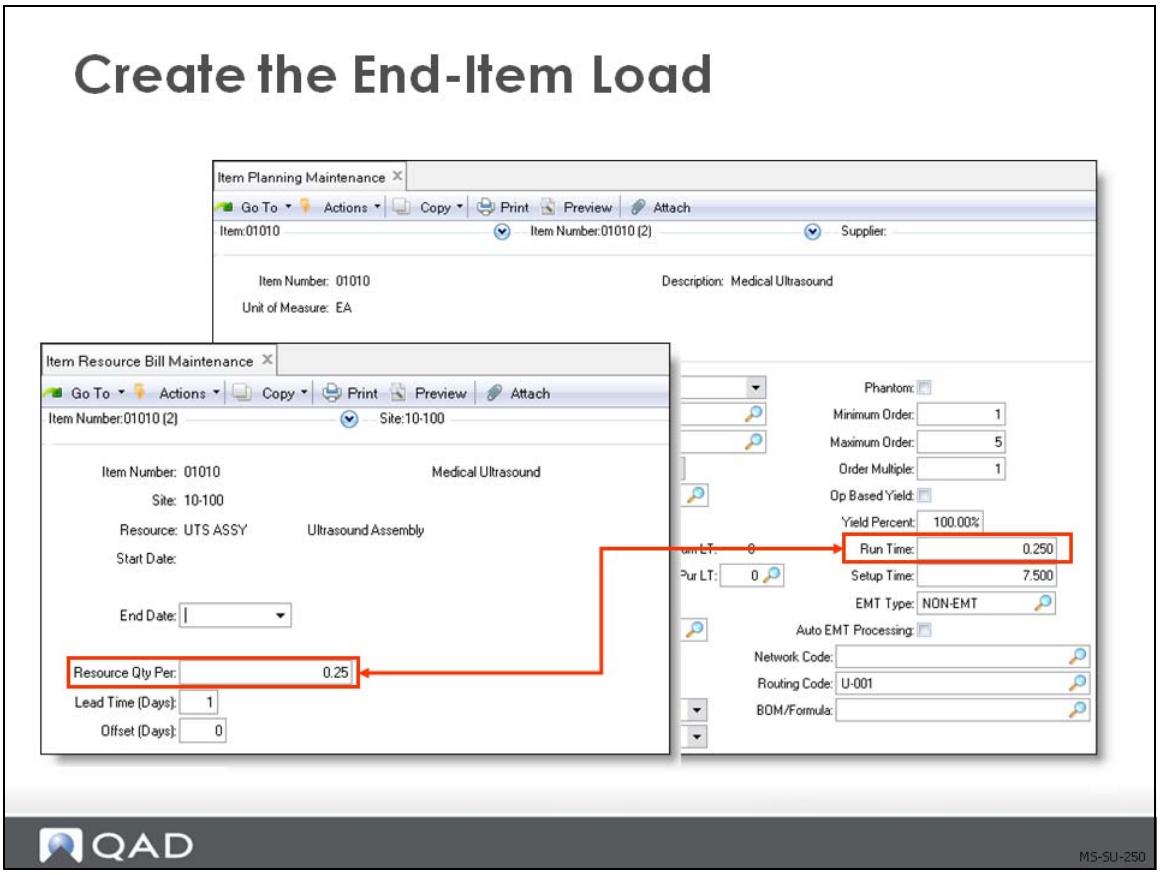
Lead Times

In order for QAD Enterprise Applications to calculate capacity, at least 1 must be entered in the Lead Time field in Item Resource Bill Maintenance (21.17).

- Lead time is the number of days over which a resource must be available

- A testing process might be required three days after work order release and need two days
  - Offset = -3, Lead Time = 2
- Schedule the first date the resource is required
  - Use work order release dates and number of days the resource is needed
- The Offset is the number of days from work order release that a resource must be available
  - Positive for days before work order release
  - Negative for days following
  - Zero for the same day

Note This method of calculating the offset is the opposite of that used for product structures.


Create the End-Item Load
Item Planning Maintenance
Go To
Actions
Copy
Print
Preview
Attach
Item:01010
Item Number:01010 (2)
Supplier:
Item Number: 01010
Description: Medical Ultrasound
Unit of Measure: EA
Item Resource Bill Maintenance
Site:10-100
Item Number: 01010
Medical Ultrasound
Site: 10-100
Resource: UTS ASSY
Ultrasound Assembly
Start Date:
End Date:
Resource Qty Per: 0.25
Lead Time (Days): 1
Offset (Days): 0
Phantom:
Minimum Order: 1
Maximum Order: 5
Order Multiple: 1
Op Based Yield:
Yield Percent: 100.00%
Run Time: 0.250
Setup Time: 7.500
EMT Type: NON-EMT
Auto EMT Processing:
Network Code:
Routing Code: U-001
BOM/Formula:
QAD
MS-SU-250

Exercise: Setup

Enter and Review a Forecast

This exercise covers how to enter and review a forecast, and how to set up and observe forecast consumption. Before doing this, however, you will review the items that will be used for the forecasting and master scheduling activities.

1. Using Product Structure Inquiry (13.6) to review the parent/component relationship for parent item 01030, and its component items.
2. In Sales Order Control (7.1.24), set Ln Format S/M to Single and set Consume Fwd to 1, Consume Back to 2.
3. Use Forecast Maintenance (22.1) to enter the following weekly forecast for item 01030 at site 10-100, beginning with the Monday of the next week and covering the following nine weeks

Weeks	Quantity
1	100.0
2	120.0
3	130.0
4	140.0
5	150.0
6	140.0
7	130.0
8	120.0
9	110.0
10	100.0

4. Run the Forecast Report (22.4) on both summary and detail for item 01030 only at site 10-100 for the next ten weeks.
5. Use Master Schedule Summary Inquiry (22.18) to run the master schedule summary inquiry for 01030 at site 10-100. You should see all ten periods of forecast, plus the forecast simulation distribution.
6. Use Sales Order Maintenance (7.1.1) to create a new Sales Order for customer 10C1003.
   a. Set the due date to two weeks from next Monday.
   b. Set Site to 10-100 and Confirmed to Yes.
   c. On order line, enter item 01030 and a quantity of 250.
7. Run the Forecast Inquiry (22.3) for 01030 at site 10-100 and review how the forecast has been consumed in the Net Forecast column.
8. Run the Master Schedule Summary Inquiry (22.18) and Master Schedule Detail Inquiry (22.21) for 01030, site 10-100 to review the forecast.

Create a Labor Resource

In this exercise, create a labor resource and a conversion factor and then compare the labor resource capacities to the load.

1 Using Calendar Maintenance (36.2.5), verify there is a shop calendar for site 10-100 (with work center and machine blank). Make sure that Monday through Friday are the established work days and that each day shows eight hours.

2 Use Resource Maintenance (21.1) to add labor resources for site 10-100.

a Enter Labor in the Resource field for site 10-100. Use a description of Labor hours. The unit of measure (UM) is HR for hours.

b Add the following two references:

Reference	Start	End Date	Cap/Day
Normal	01/01/*YY* [*YY* is the current year]	[Blank]	32 [4 assemblers x 8 hours/day]
Downtime	[Four weeks from next Monday]	[Five weeks from next Monday]	8

c Use Resource Browse (21.2) to verify your data is correct. Set the browse to begin at labor.

Add a Family Item

In this exercise, you will add a family item in order to forecast and schedule multiple items within the same family.

1 Use Item Master Maintenance (1.4.1) to create a family planning item to represent the ultrasound equipment family.

Field	Data
Item Number	01000
Description	Ultrasound equipment
Product Line:	10
Item Type	Family
Status	ACTIVE
Site:	10-100
Master Schedule:	Yes
Plan Orders:	Yes
Order Policy:	POQ
Buyer/Planner:	[your initials]
Pur/Mfg:	F

2 Using Product Structure Maintenance (13.5) to create the planning bills for family item 01000. Add parent item 01000 in the product structure and add its components under it:

Component	Description	Quantity	Structure Type	Forecast Percent
01010	Medical Ultrasound	1	P	10%
01020	Implantable Ultrasound	1	P	20%

Component	Description	Quantity	Structure Type	Forecast Percent
01030	Consumer Ultrasound	1	P	30%
01040	Industrial Ultrasound	1	P	40%

3 Use Forecast Maintenance (22.1) to enter a forecast for family planning item 01000 at site 10-100; 1000 for each of six weeks, starting with next week.

4 View items 01000 and 01010 at site 10-100 in Master Schedule Summary Inquiry (22.18).

5 Run Selective Materials Plan (23.3) for items in the range from 01000 to 01040 at site 10-100; enter mrp in the Output field.

6 Review the Master Schedule Summary for items 01000, 01010, 01020, 01030, and 01040. The forecast for the planning item is shown for pegging purposes only. Because the purchase/manufacture code is F, MRP calculates production forecast but does not plan orders for the planning item.

7 Using Sales Order Maintenance (7.1.1), create a sales order in which you sell item 01010 at site 10-100, qty 100, due one week from Monday to customer number 10C1003.

8 Run Selective MRP for items in the range from 01000 to 01040 at site 10-100.

9 Review the Master Schedule Summary for 01000 and 01010.

Create an Item Resource Bill

In this exercise, you create an item resource bill that will be used to determine if the master schedule is achievable.

1 Items 01010, 01020, 01030, and 01040 require labor resources. Use Item Resource Bill Maintenance (21.17) to create an Item Resource Bill with the following data:

Item	01010	01020	01030	01040
Site:	10-100	10-100	10-100	10-100
Resource:	Labor	Labor	Labor	Labor
Start Date:	[blank]	[blank]	[blank]	[blank]
End Date:	[blank]	[blank]	[blank]	[blank]
Resource Qty. Per:	4	0.05	0.1	0.2
Lead Time:	2	1	1	1

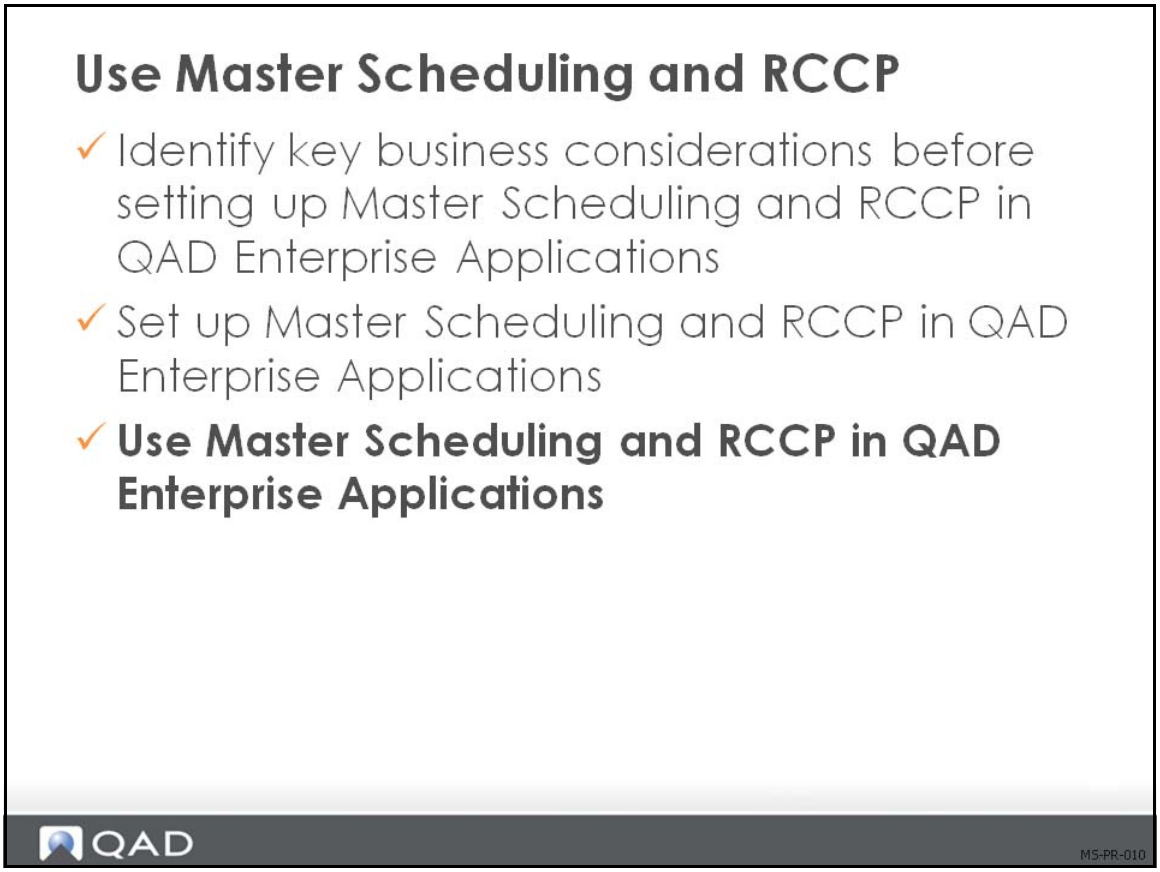
2 Review the Item Resource Load Summary Inquiry (21.21) and Item Resource Load Detail Inquiry (21.23)

- Has the schedule exceeded capacity in any period?
- Based on this information, do you think that the plan can be made?

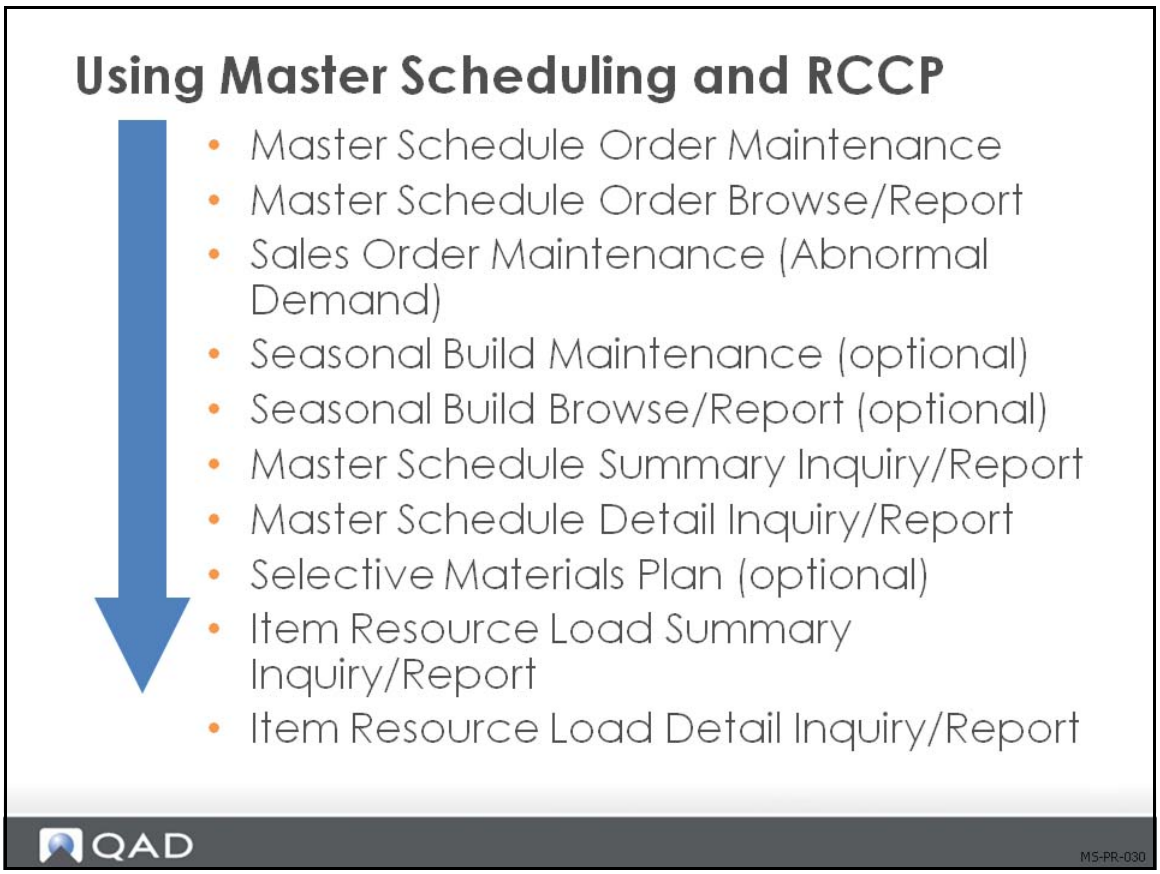
Chapter 4

Using Master Scheduling and RCCP

Course Overview

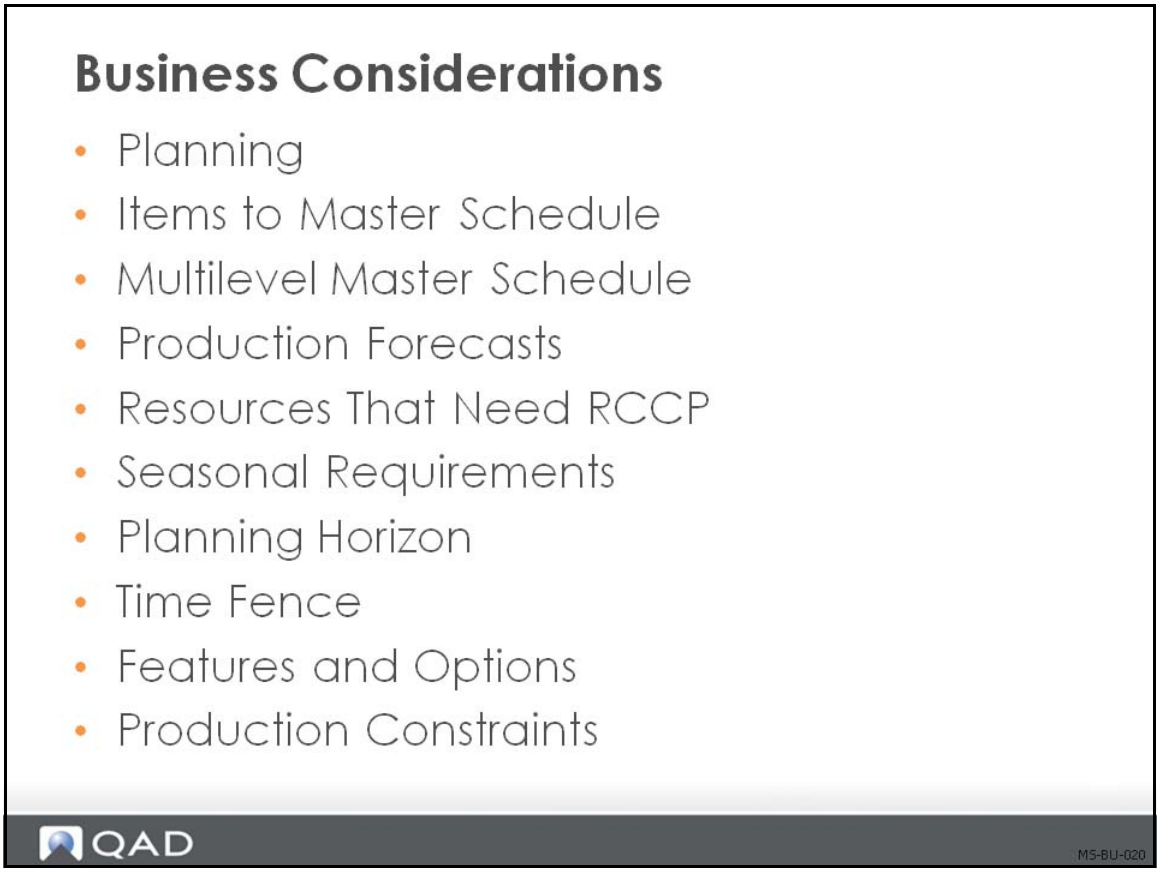


Using Master Scheduling and RCCP

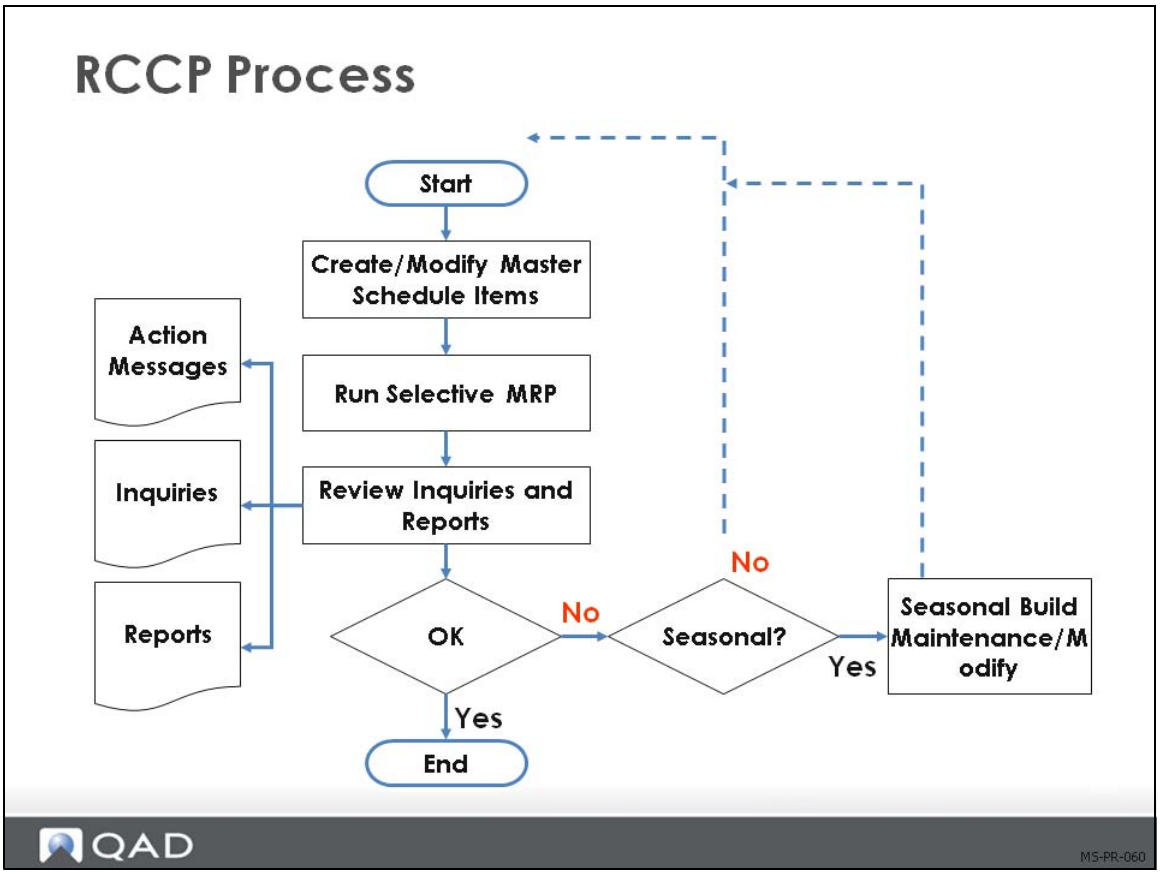


In this section you learn how to use Master Scheduling and RCCP in QAD Enterprise Applications.

Processing Demand and Supply

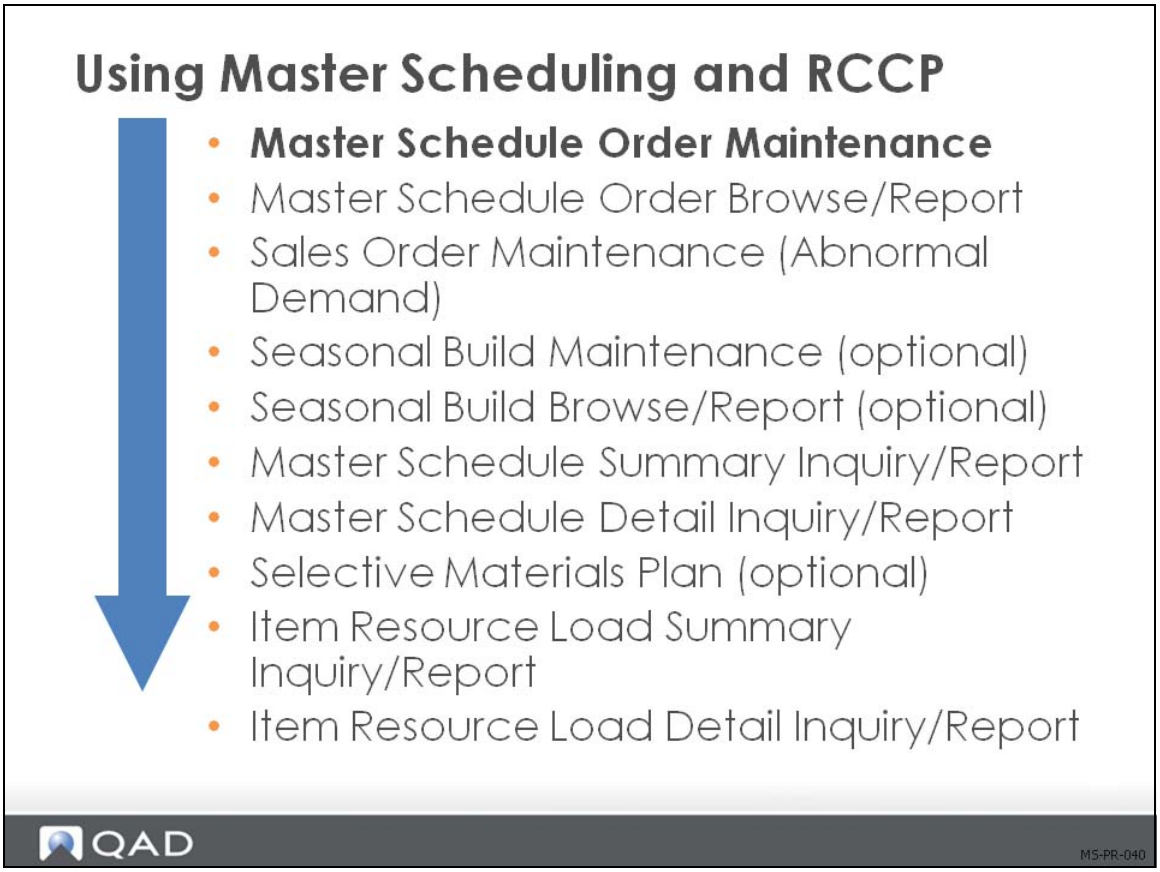


The master scheduler reviews the requirements of the forecast, sales orders, net forecast, seasonal requirements and other demands and creates a master schedule of work orders and or repetitive schedules to satisfy those demands. Rough Cut Capacity Planning is used to ensure the planned master schedule can be done. If it cannot be done adjustments must be made to the master schedule either in the quantities or due dates or both. The master scheduler can use MRP to plan work orders to cover the net forecast or they can create master scheduled work orders manually. Some businesses will use a combination of these techniques for different product lines or in different facilities.

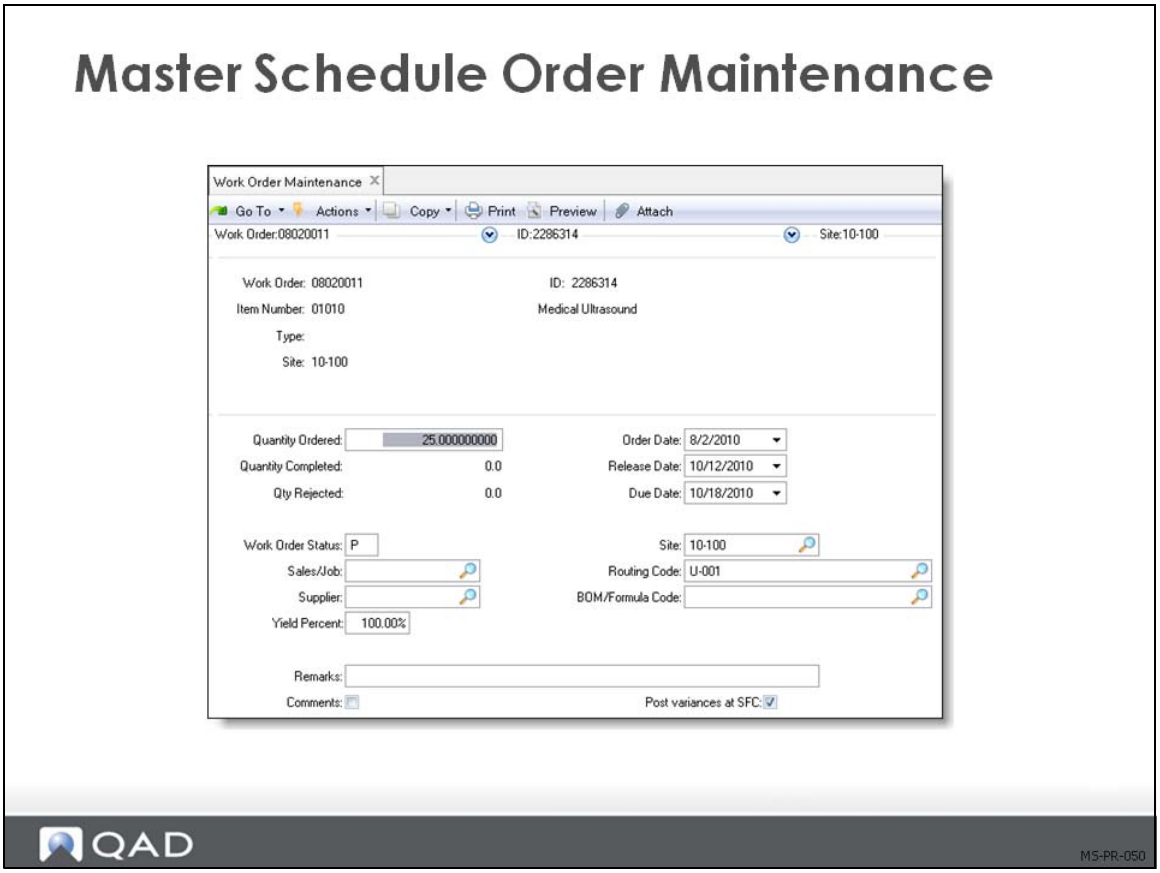


Master scheduling is an iterative process as this diagram shows.

Master Schedule Order Maintenance



Master Schedule Order Maintenance



Note This screen is the same as Work Order Maintenance (16.1). Within the system, master schedule work orders and work orders created in the work order module are identical.

To manage the master schedule manually, use Master Schedule Order Maintenance to create work orders for your master schedule items. Enter master schedule orders as firm planned orders and manage and release them like normal work orders.

To have MRP review master scheduled items and produce action messages, set the following values in Item Planning Maintenance (1.4.7):

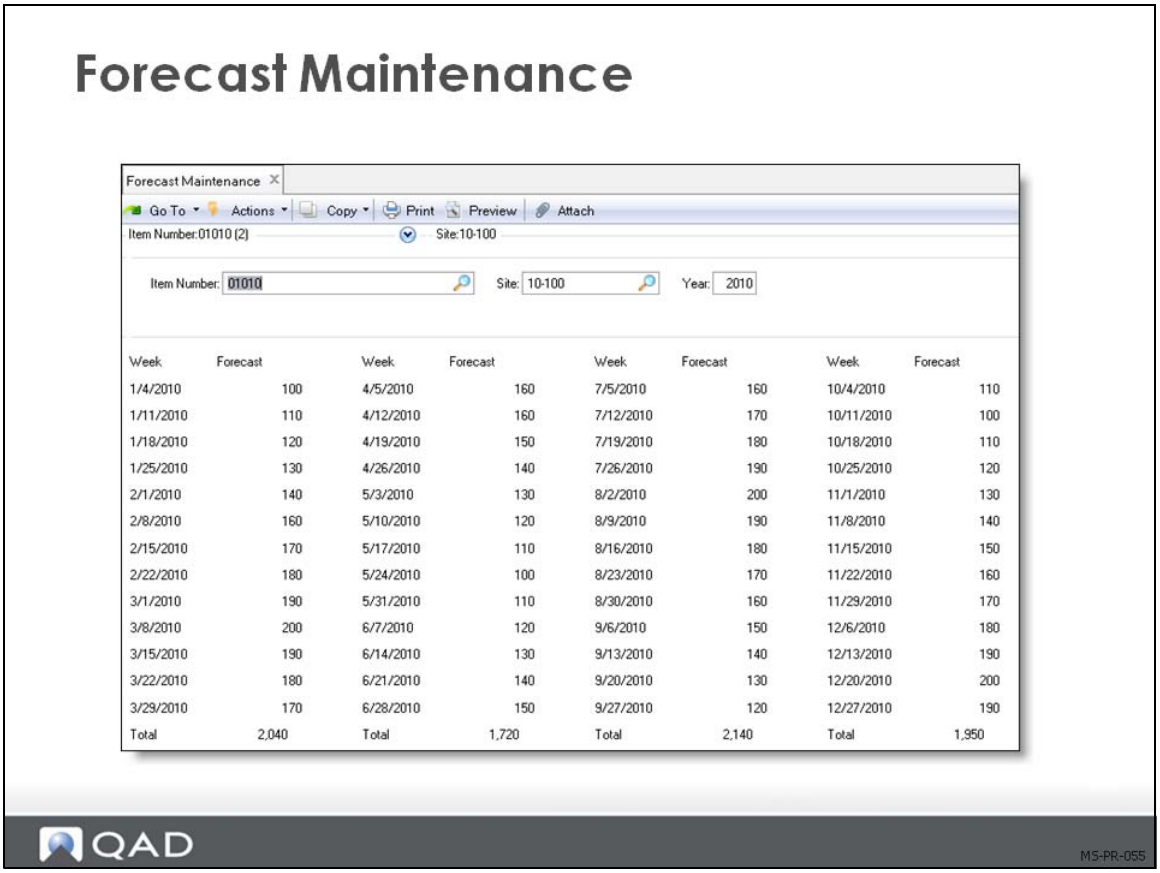
- Master Schedule = Yes
- Plan Orders= No
- Order Policy= Any option other than blank

Note These settings insure the system will not create planned orders, but will create action messages about the orders you create.

The firmed supply orders create the master schedule and become the primary input to MRP.

- Firmed planned work orders using Master Schedule Order Maintenance (22.13)
- Repetitive schedules using Schedule Maintenance (18.2.1). This can be used to master schedule items, even if work orders track actual production (this means you have to take the exploded type S work orders from the repetitive schedule and change them to R)
- Purchase requisitions using Purchase Requisition Maintenance (5.1.4)

MPS Using Forecast Maintenance

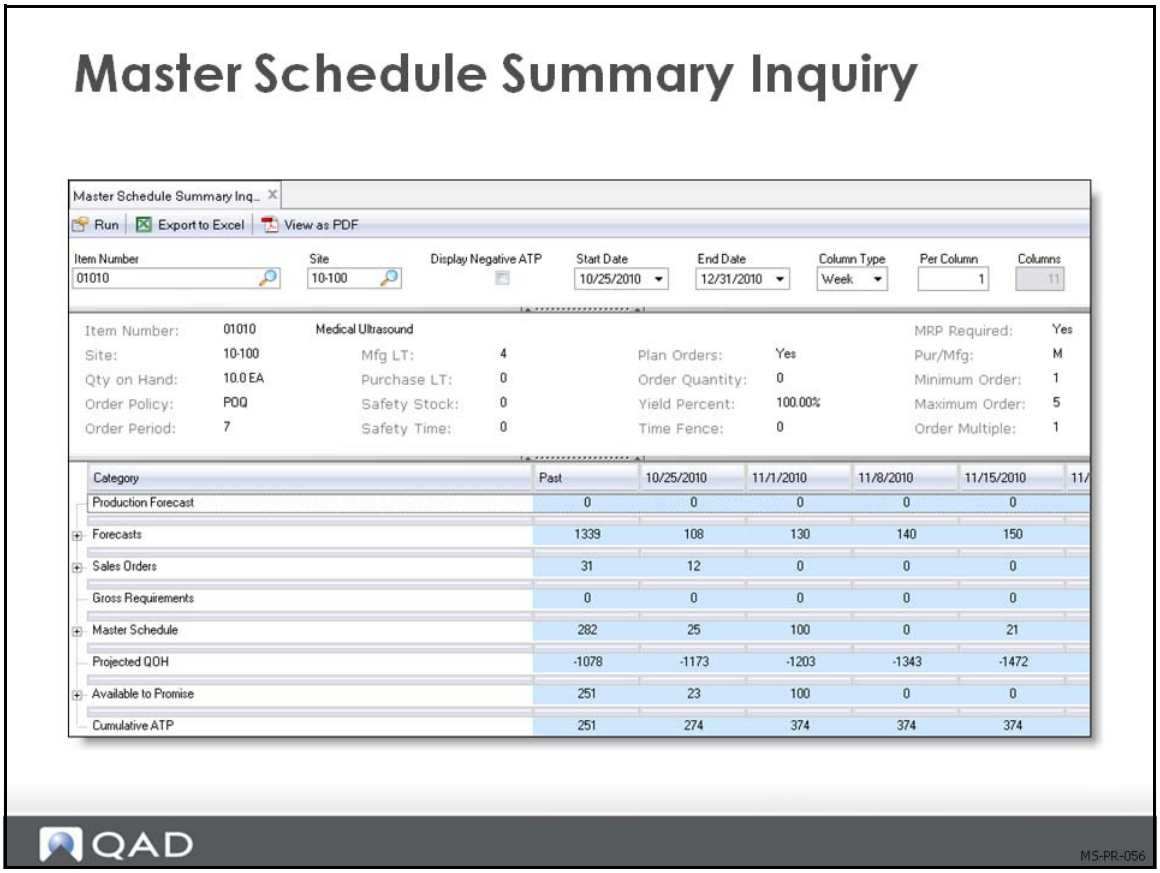


MPS can also be loaded using Forecast Maintenance (22.1). This function allows you to enter up to 52 weekly buckets of forecast demand for an item at a site. This demand is seen by MRP and planned orders are created for the net forecast. The master scheduler can then review the plan using the summary and detail inquires.

To use this functionality, set these values in Item Planning Maintenance (1.4.7):

- Master Schedule: Yes
- Planned Orders: Yes
- Order Policy: Any valid value

Master Schedule Summary Inquiry



Master Schedule Summary and Detail Inquiries/Reports

The Master Schedule Summary Inquiry (22.18) and Report (22.19) are let the master scheduler review the overall situation for an item. The inquiry and report both display the information listed here.

Note The Master Schedule Detail Inquiry (22.21) and Report (22.22)display the same information as the Master Schedule Summary Inquiry (22.18) and Report (22.19), sequenced by due date. They also include source-to-demand pegging details, allowing you to identify the actual work order or sales order generating a particular item requirement.

Header Information

The header show the item, site, start (and or end date) date of the inquiry and whether the buckets are D days, W weeks, M months, or P general ledger period. It also shows how many periods you choose to display in each column. You can display two weeks in each column for example. The header also shows the quantity on hand the MRP Required field and all of the item planning data for the site specified.

Production Forecast. System-calculated forecast used in multilevel master scheduling

Forecast. Forecast quantity for an item, either loaded into forecast summary tables using Simulation to Summarized Forecast or entered manually using Forecast Maintenance (22.1) or Forecast Worksheet Maintenance (22.2).

Sales Orders. Demand derived from confirmed sales orders and required ship schedules

Gross Requirements. The sum of an item's requirements from forecasts, higher-level products, confirmed sales orders, required ship schedules, service items, and intersite orders generated by DRP. Gross requirements do not take into account inventory on hand or scheduled receipts.

Master Scheduled Receipts. Total scheduled receipts for an item from work orders, repetitive schedules, purchase orders, and distribution orders.

Projected QOH. Projected item quantity on hand, calculated by the system. This is a projection by period of an item's on-hand balance plus scheduled receipts minus gross requirements.

Available-to-Promise. The uncommitted portion of inventory or planned production, calculated by deducting real demand from real supply.

Seasonal Build. For products with seasonal demand cycles, you may need to build up inventory in advance of periods of peak demand.

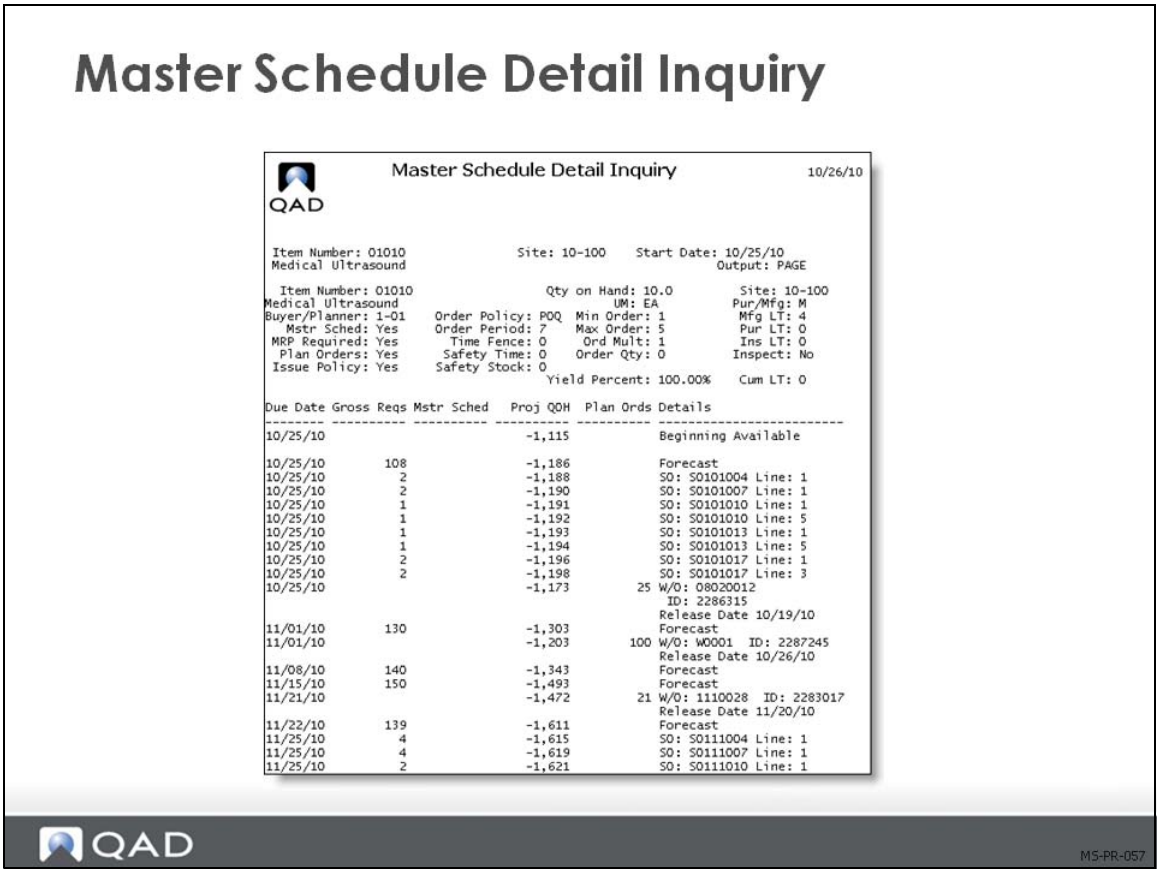
You can do this using work orders or repetitive schedules, or you can use seasonal build requirements to build up inventory to a predetermined level prior to its expected demand.

Seasonal build requirements let master schedulers specify a target inventory level for seasonal demand items that is not included when calculating ATP quantities, but can still be allocated and shipped on sales orders and customer schedules.

Seasonal build quantities appear separately on master schedule reports that display ATP quantities.

Note The seasonal build heading and quantities only display when there are seasonal build requirements.

Master Schedule Detail Inquiry

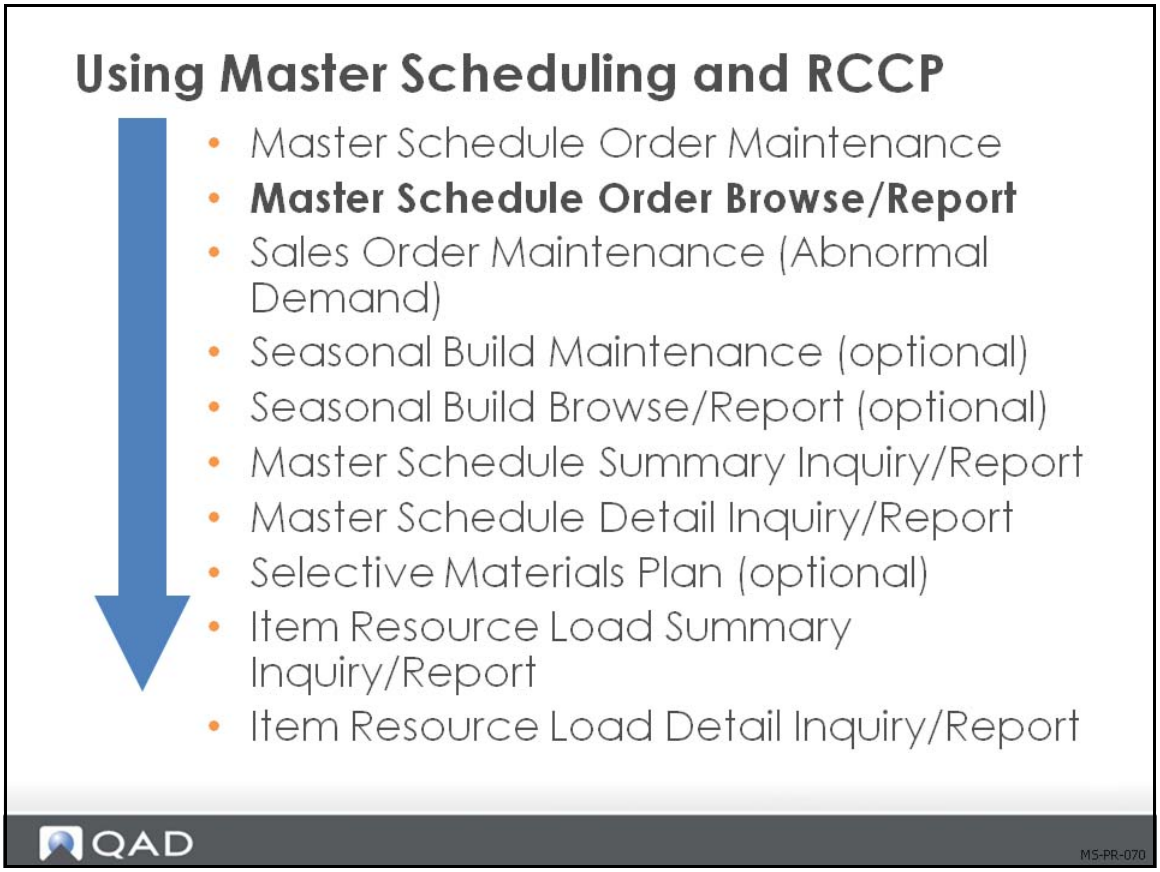


The Master Schedule Detail Inquiry (22.21) provides a very different view of the MPS item. This view shows in a vertical list format each transaction, by date, that effects the item at this site. The display also shows detail information about both the source of the demand and the supply.

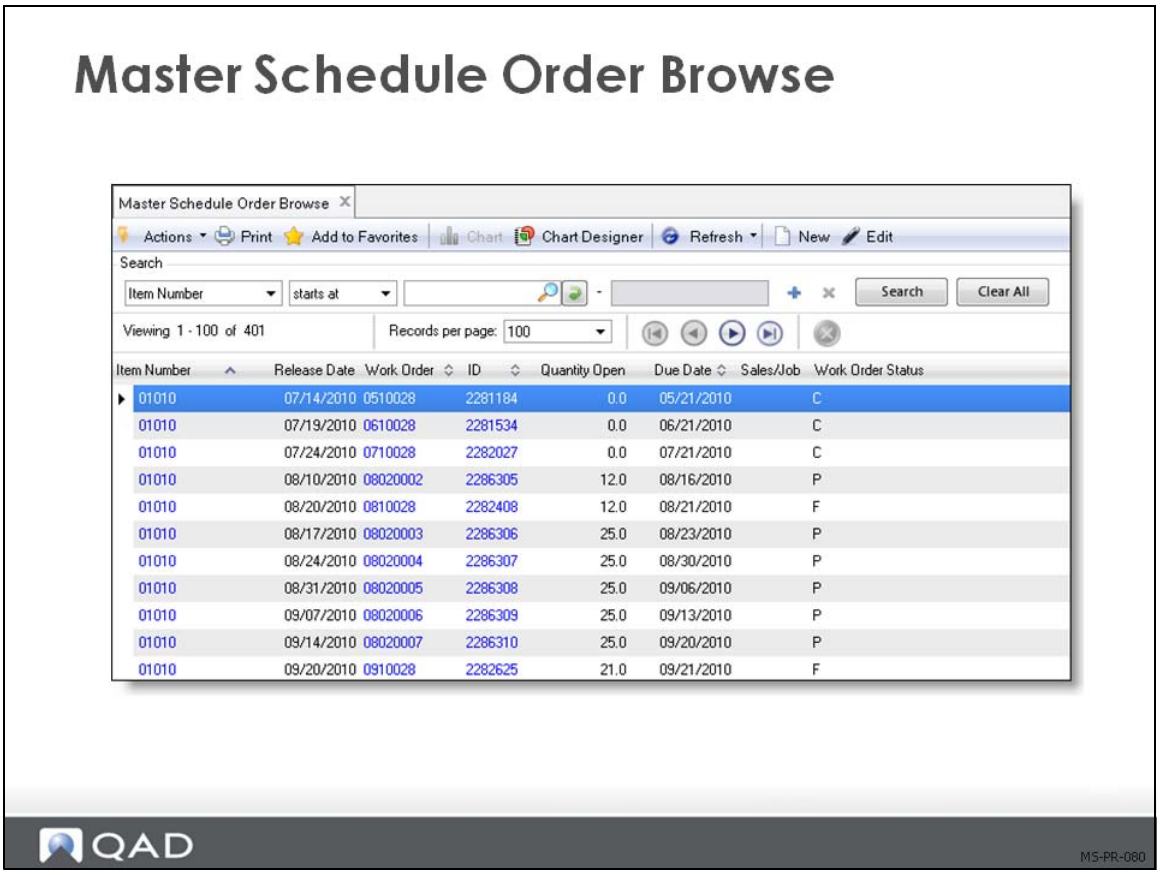
This example shows the demand that is from a production forecast for a higher level planning item. We also see the system has planned an MRP W/O to satisfy that demand, and its release date. Once the work orders are firmed (approved) or released the quantity will move into the Master Schedule column.

As with the summary inquiry the header shows the item planning data.

Master Schedule Order Browse/Report



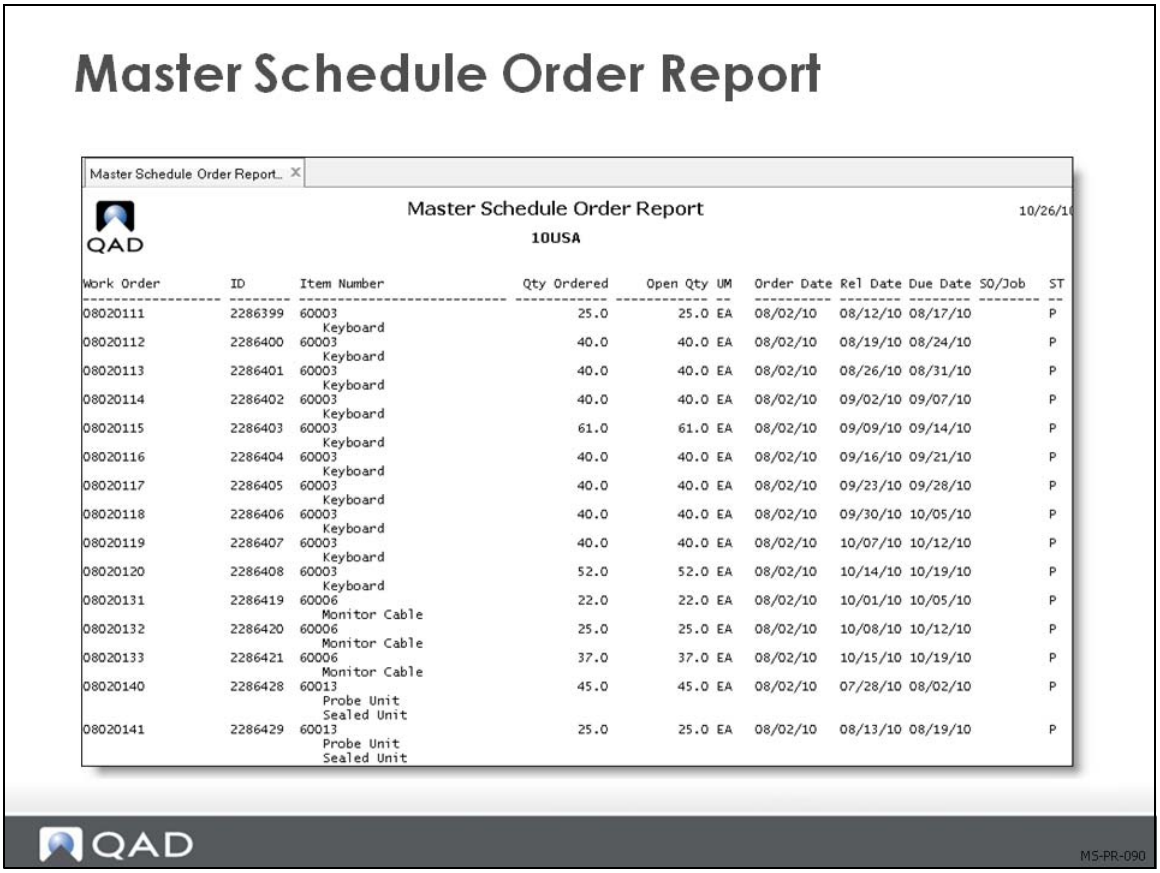
Master Schedule Order Browse



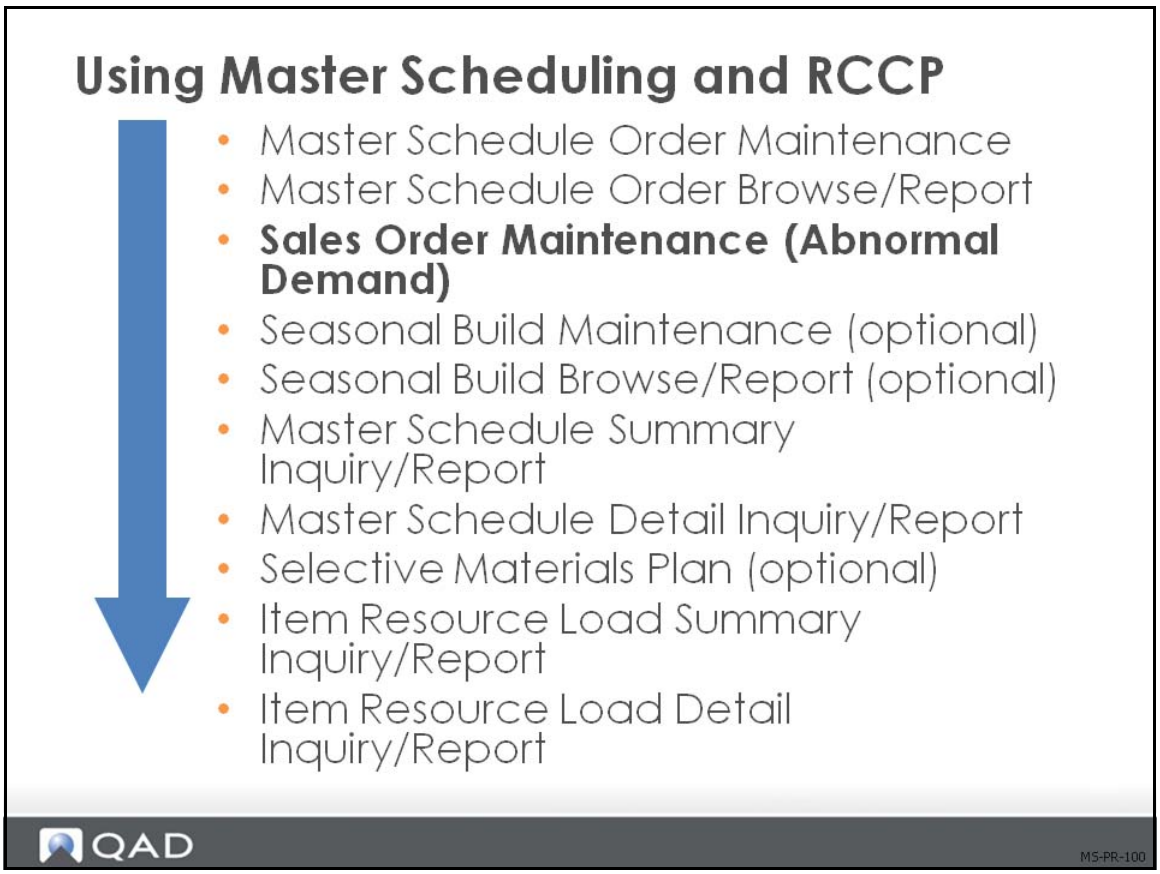
Status.

- F = Firm
- P = Planned

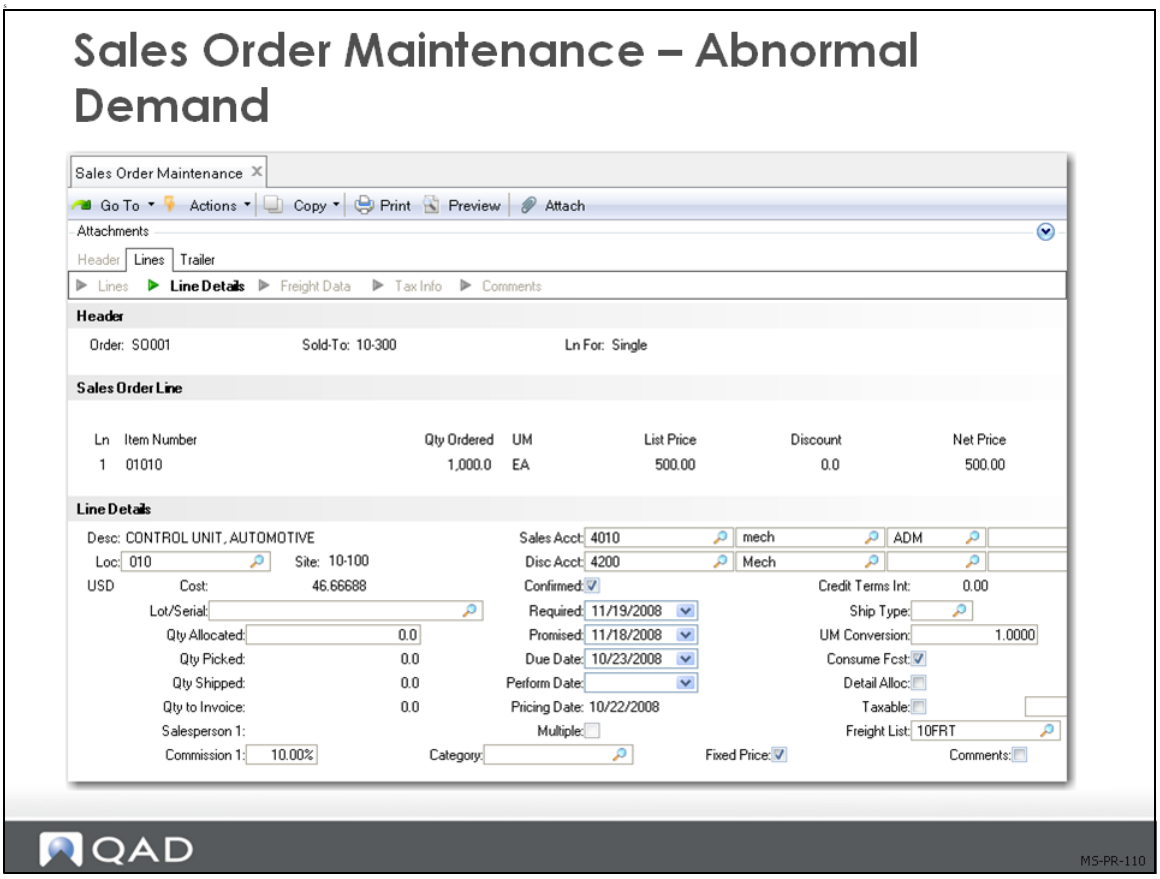
Master Schedule Order Report



Sales Order Maintenance (Abnormal Demand)



Abnormal demand is usually a large, unexpected sale.



In some circumstances, the master scheduler may not want forecast consumption to occur. This would be the case when an unexpected sales order is received, which was not part of the forecast and should not be considered for the next year's forecast.

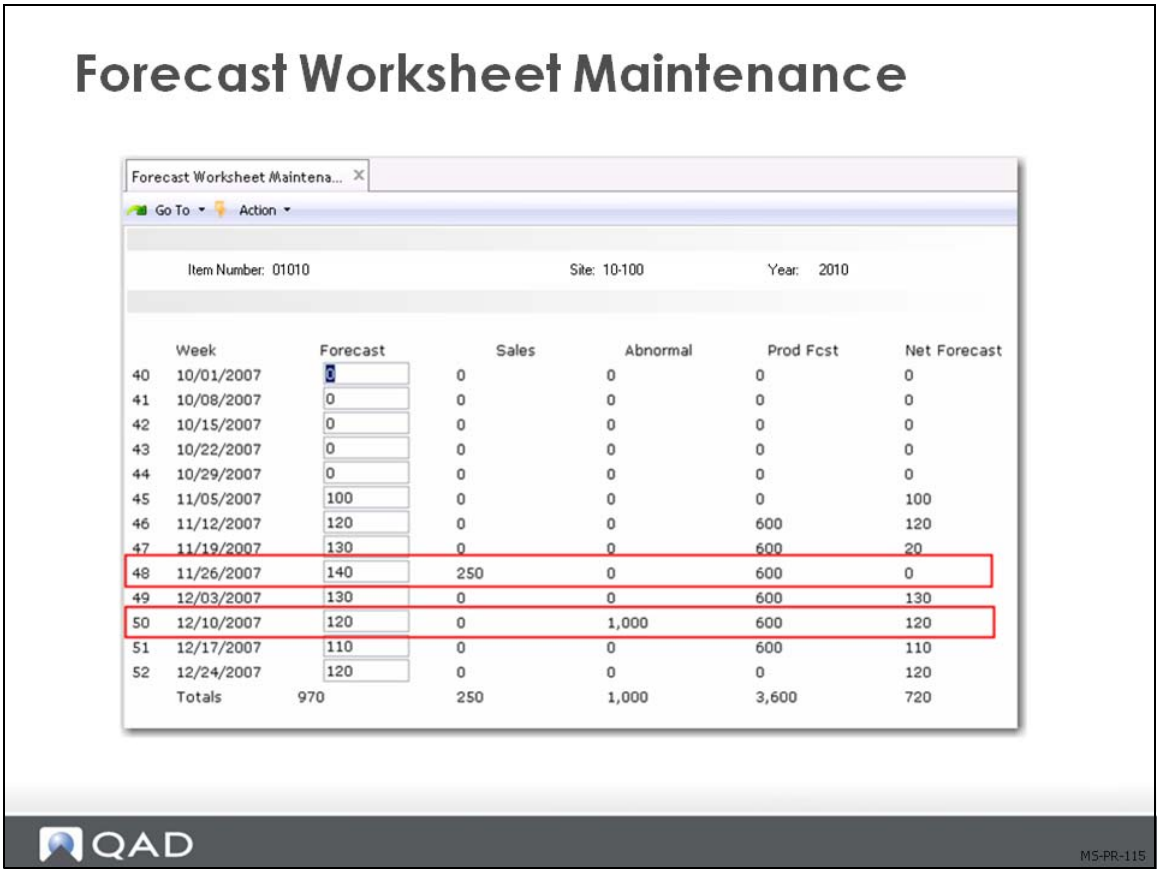
To indicate a sales order as Abnormal Demand in QAD Enterprise Applications, set Consume Forecast to No in Sales Order Maintenance (7.1.1). MRP will now plan this independent demand requirement without consuming forecasts for the period.

Some Causes of Abnormal Demand

- Unplanned orders received due to:
  - Hurricanes
  - Earthquakes
  - Floods
  - New customers
  - New markets
- These types of orders generally do not apply to forecasts

In the case of new customers and new markets a decision needs to be made whether these reflect ongoing business in which case you will want to adjust the forecast to take them into account.

Forecast Worksheet Maintenance



Forecast Worksheet Maintenance (22.2) shows 13 weeks per frame and cycles through however much data you have entered. It is a very useful screen in that it displays the current forecast, actual sales by period, abnormal sales, the production forecast and the net forecast. In addition it is a maintenance screen so you can modify the forecast as required.

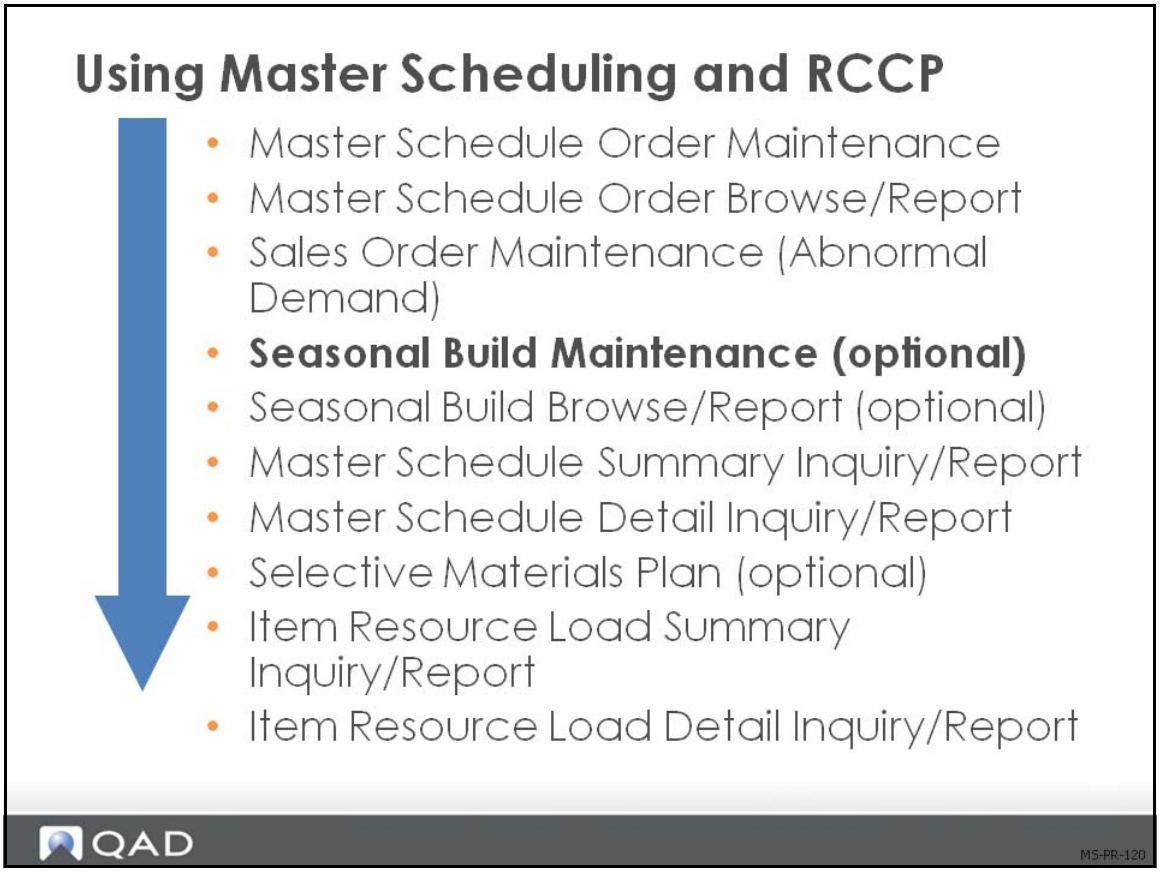
In the screen above note that the sale in period 48 has consumed the forecast in the current period and gone back a period to consume the balance of the sale as specified in the consume forward and back logic in Sales Order Control (7.1.24).

The abnormal sale in period 50 has not consumed the forecast. The sales order Consume Forecast field was unchecked on this sale order.

The production forecast comes from the forecast for the family item set up earlier and is showing how many of this item are required based on the percent distribution of the family.

It is very helpful for the master scheduler to understand the sources of demand for the various items. The master scheduler might also detect on this screen a very large sales order that was consuming forecast when it should not because someone failed to set Consume Forecast to No.

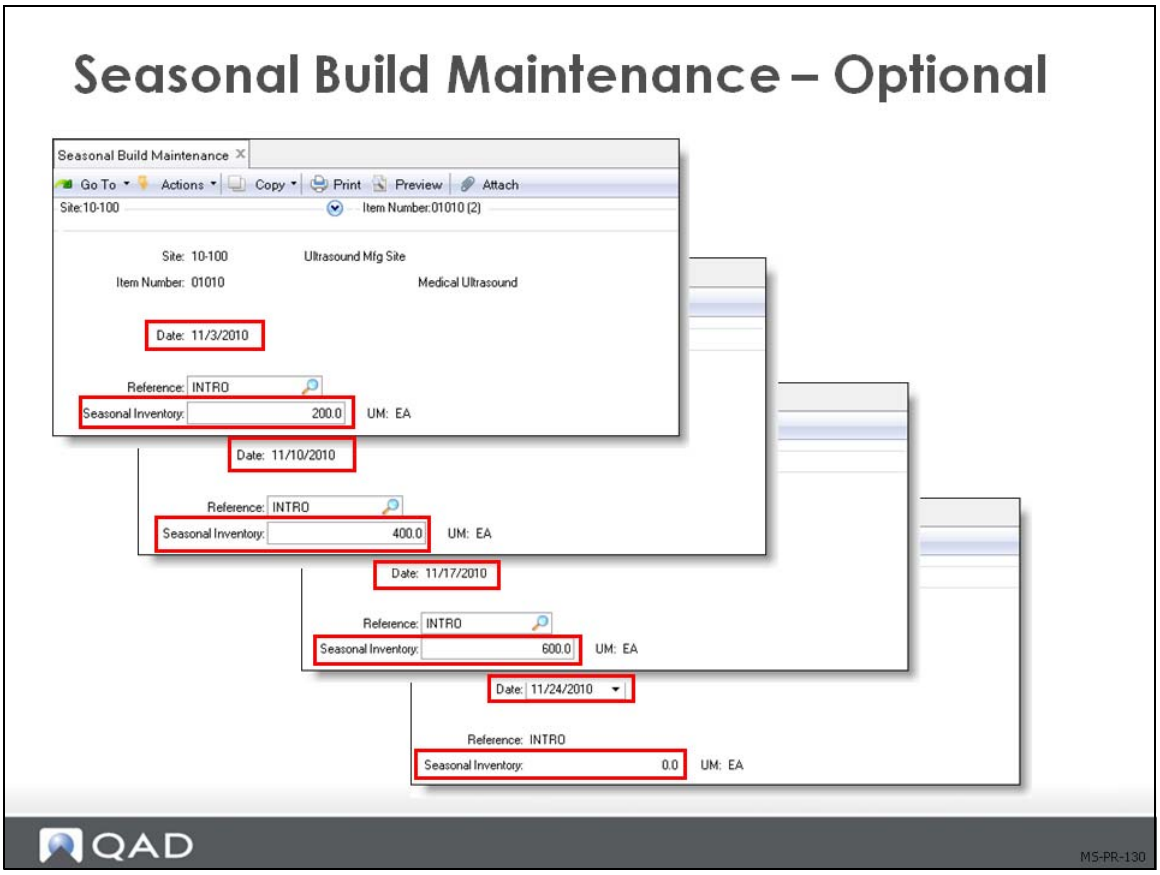
Seasonal Build Maintenance



This program allows incremental buildup and release of inventory. At times, the master scheduler may need incremental inventory build up to a predetermined level. This situation most often occurs for seasonal demand items.

- Need to build up an item's inventory prior to its expected demand
- Input into the master schedule is required

Although master scheduled orders could be entered to adjust for seasonality, identifying a demand as seasonal build prevents MRP from issuing action messages to cancel or delay orders for those items whose demand is not yet apparent.



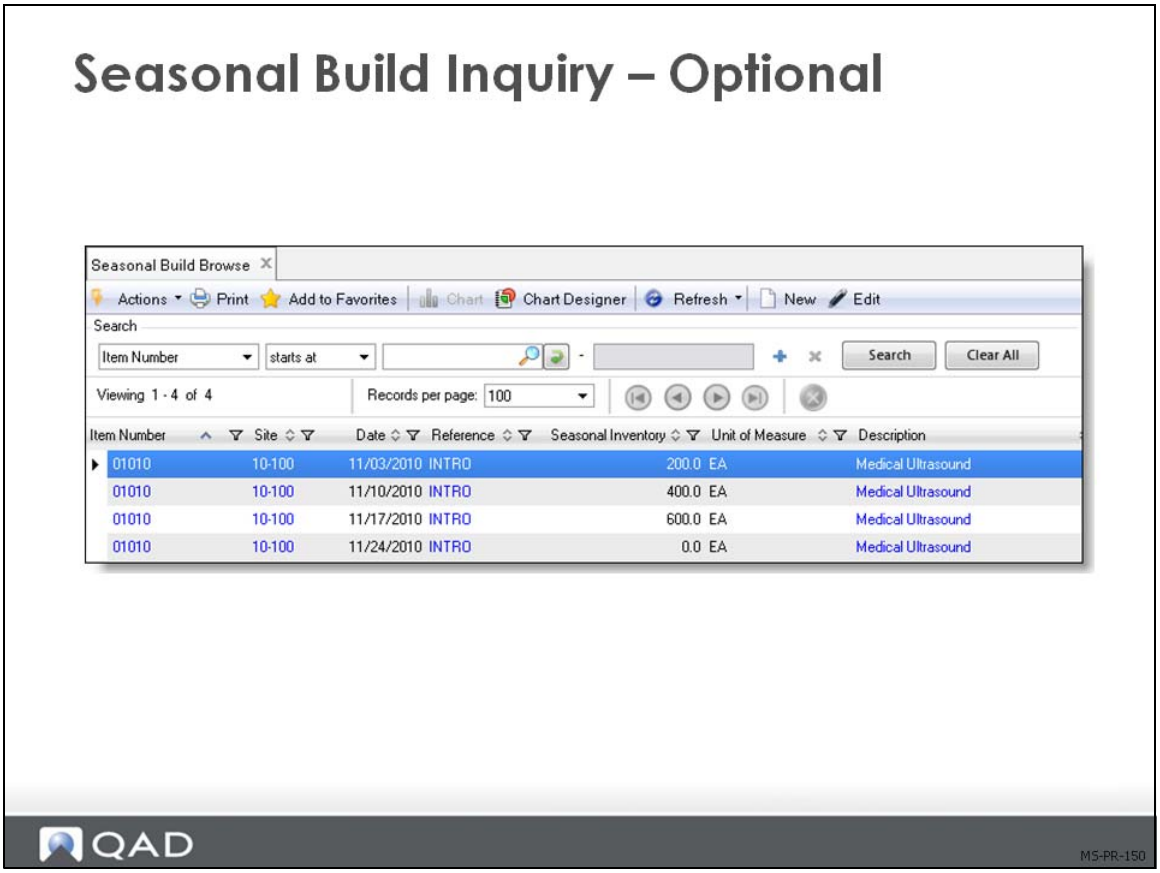
In this example 600 units are needed over and above forecast to support a product launch. It is planned to build them at the rate of 200 units per week for the next three weeks. The seasonal build is set up as shown in the slide.

Enter seasonal build inventory into the system using Seasonal Build Maintenance (22.9).

- At the end of the first build week there will be 200 units in inventory.
- At the end of the second build week there will be 400 units in inventory.
- At the end of the third build week there will be 600 units in inventory.
- At the end of the fourth week, set the seasonal inventory to zero. This releases the 600 units to be available.

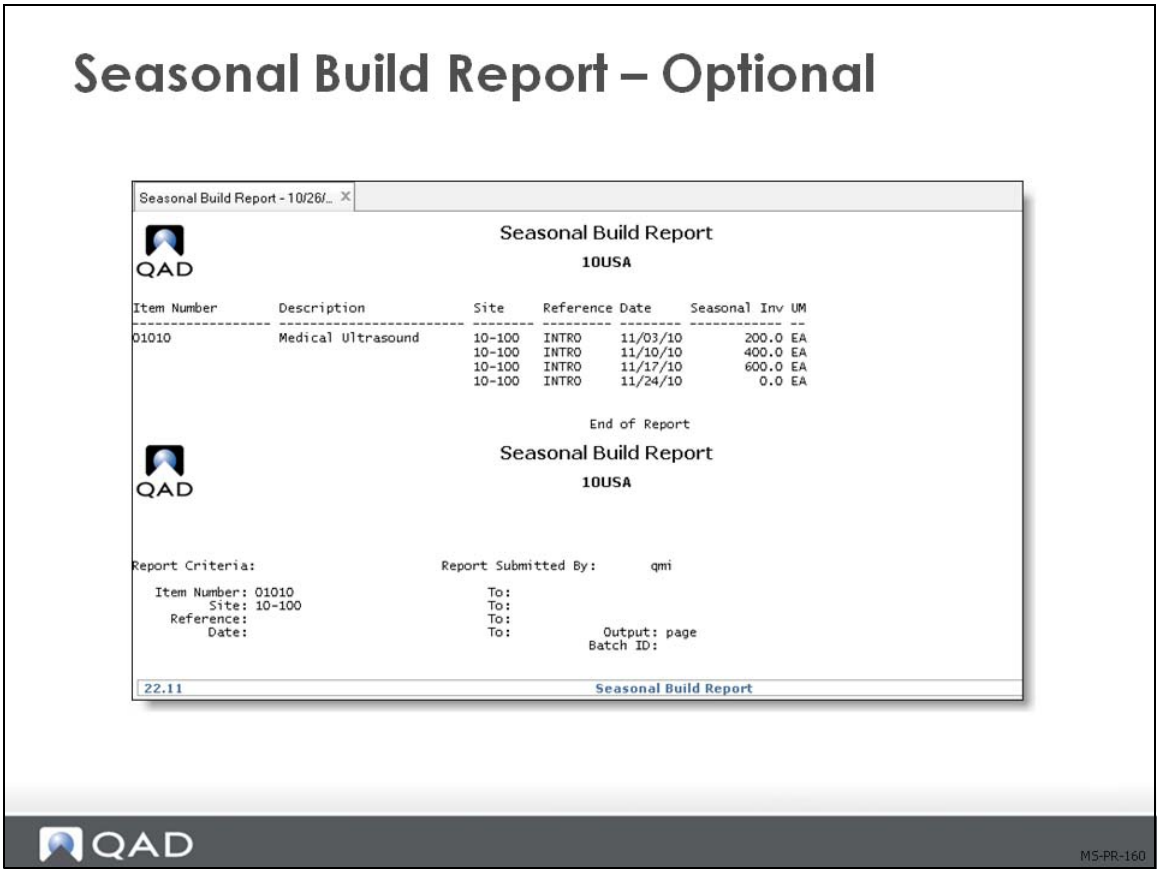
Seasonal Build Browse/Report

Seasonal Build Browse



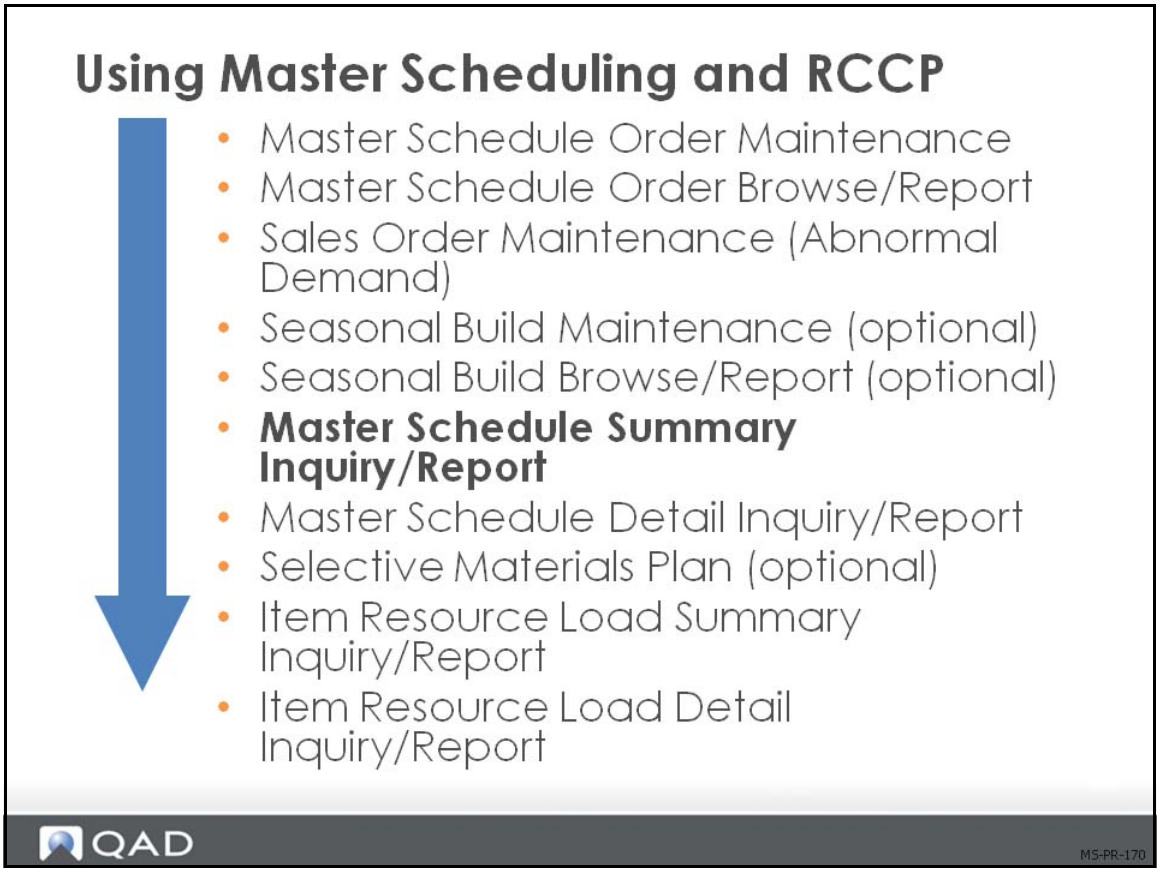
The Seasonal Build Browse (22.10) shown above illustrates a completed seasonal build.

Seasonal Build Report

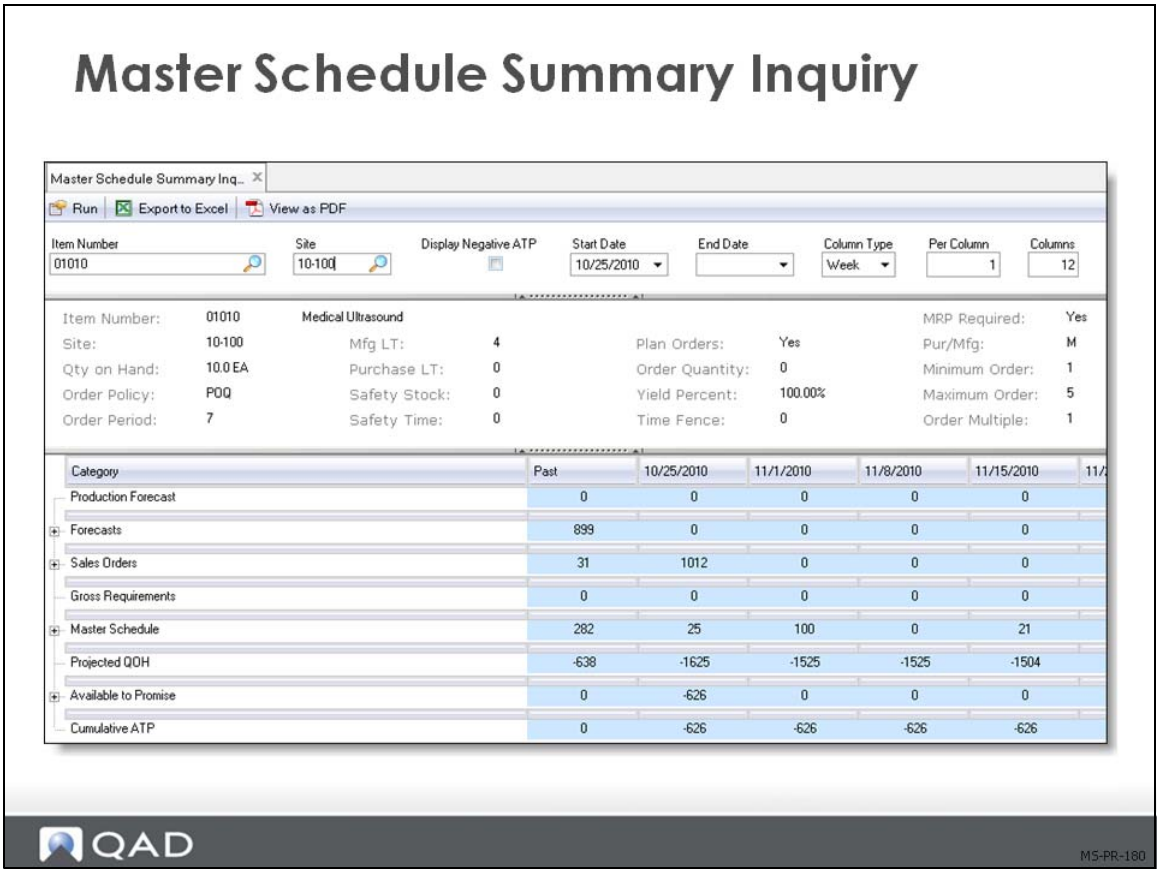


The Seasonal Build Report (22.11) shown above displays the same information is a slightly different format.

Master Schedule Summary Inquiry/Report



Master Schedule Summary Inquiry



The master schedule summary is the single most crucial screen for planners to understand. It highlights:

- Production forecast, which is the system calculated forecast used in multilevel master scheduling
- Forecast, either manually loaded or from Simulation to Summarized Forecast or independent demand entered in Forecast Maintenance
- Sales orders, demand derived from sales orders, required ship schedules, independent demand entered in Sales Order Maintenance
- Gross requirements, the sum of an item's requirements from:
  - Forecasts
  - Higher level products
  - Confirmed sales orders
  - Required ship schedules
  - Service items
  - Intersite orders generated by DRP

Gross requirements do not take into account inventory on hand or scheduled receipts.

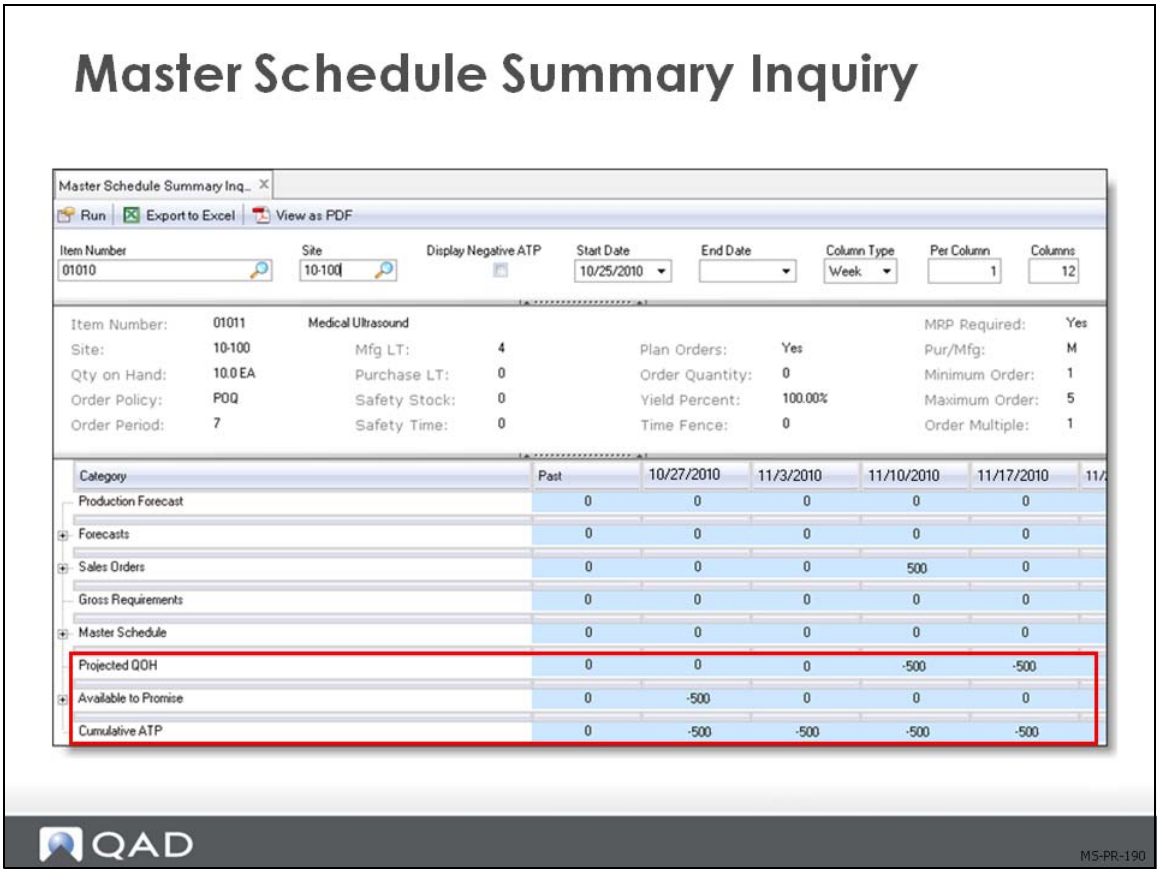
- Manufacturing requirements from a parent work order
  - Can be both master scheduled and a component on a multilevel bill

  - May be intersite demand in DRP environment
- Master Scheduled Receipts, the total scheduled receipts for an item from:
  - Work orders
  - Repetitive schedules
  - Master schedule orders
  - Purchase orders
  - Distribution orders
- Projected quantity on hand (QOH), a system calculated period-by-period projection of an item's on-hand balance plus scheduled receipts minus gross requirements
- Available-to-Promise, the uncommitted portion of inventory or planned production calculated by deducting real demand from real supply.
- Seasonal Build, the quantity in inventory for that period NOT INCLUDED in available-to-promise quantity.

Available-to-Promise Calculation (QAD Enterprise Applications methodology)

- Beginning QOH
  - + Master schedule receipts
  - - Gross requirements
  - - Sales (until next master schedule)
  - - Increased seasonal build
  - + Decreased seasonal build

Order Promising



The completed master schedule provides a basis for order promising. Order promising simply verifies whether a sales order can be filled within a specific time frame given other demands and the currently scheduled supply orders.

Available-to-Promise (ATP)

- Shows true day-to-day supply available to fulfill incoming sales orders
- Order promising verifies whether a sales order can be filled within a specific time frame
  - Check Avail Promise row of the Master Schedule Summary Inquiry (22.18)
- Tracks real supply against real demand
- Does not factor in Forecast or Prod Forecast quantities
- Does factor in Seasonal Build
  - Increase in Seasonal Build decreases ATP
  - Decrease in Seasonal Build increases ATP

The calculation occurs on any date when a Master Sched receipt is due or a Seasonal Build quantity is made available and a net increase in supply is caused.

- Includes all sales orders and gross requirements up to the next increase in available supply

Calculation

Master Sched – Sales Orders – Gross Requirements – Seasonal Build net increases + Seasonal Build net decreases = Available-to-Promise

Warning Sales orders can use ATP from the past, which can be confusing when interpreting the calculation.

This is true except in the first instance of available-to-promise on a summary screen.

To start the ATP out, the beginning quantity on hand is added.

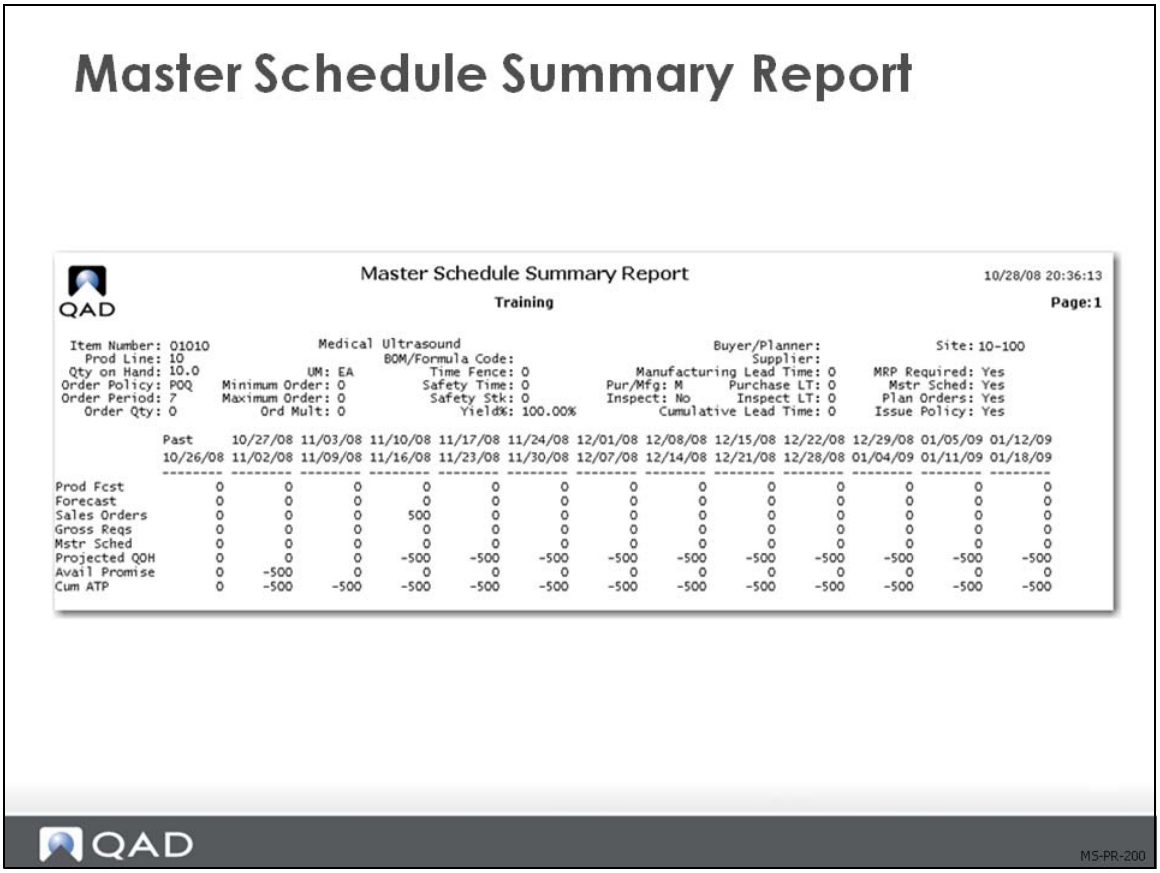
In the Past columns of the daily Master Schedule Summary (as well as in the weekly and monthly displays), ATP is Time Period sensitive (Net Amount):

- All uncommitted supply that can be promised to new sales orders is shown
- The ATP is decremented during sales order entry and is revised immediately

Cumulative Available-to-Promise (ATP)

Classic ATP only calculates a value in the first period if there is on hand balance or in any period with a master schedule order due. Using this rule the second period above does not have an ATP value. In Cumulative ATP an unconsumed portion of a periods ATP may be carried forward until it is consumed. Using this rule the second period has ATP carried forward from the first period.

Master Schedule Summary Report



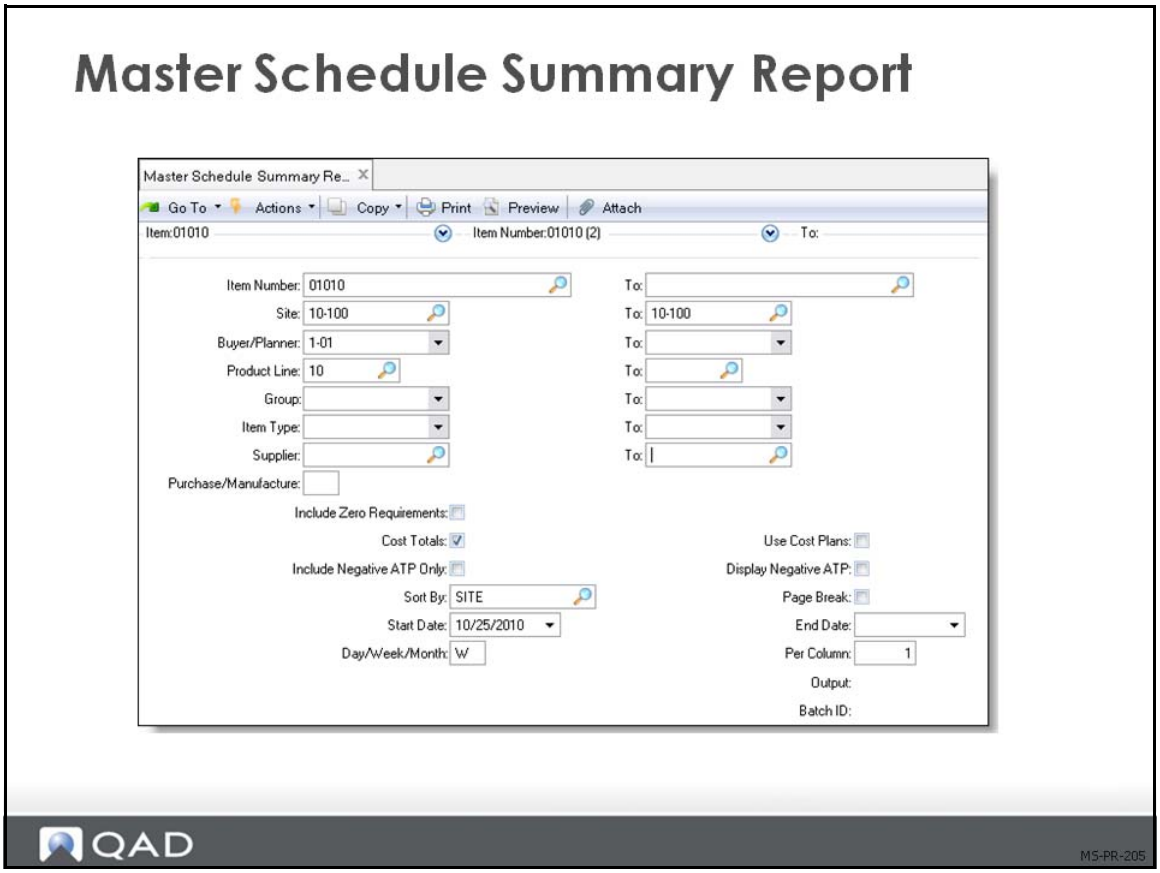
The inquiry is always for a single item at a single site. You can specify a start and end date and the bucket type and number of bucket periods per column.

The report:

- Provides a printed copy of the Master Schedule Summary Inquiry
- Gives costing data of the quantitative data displayed

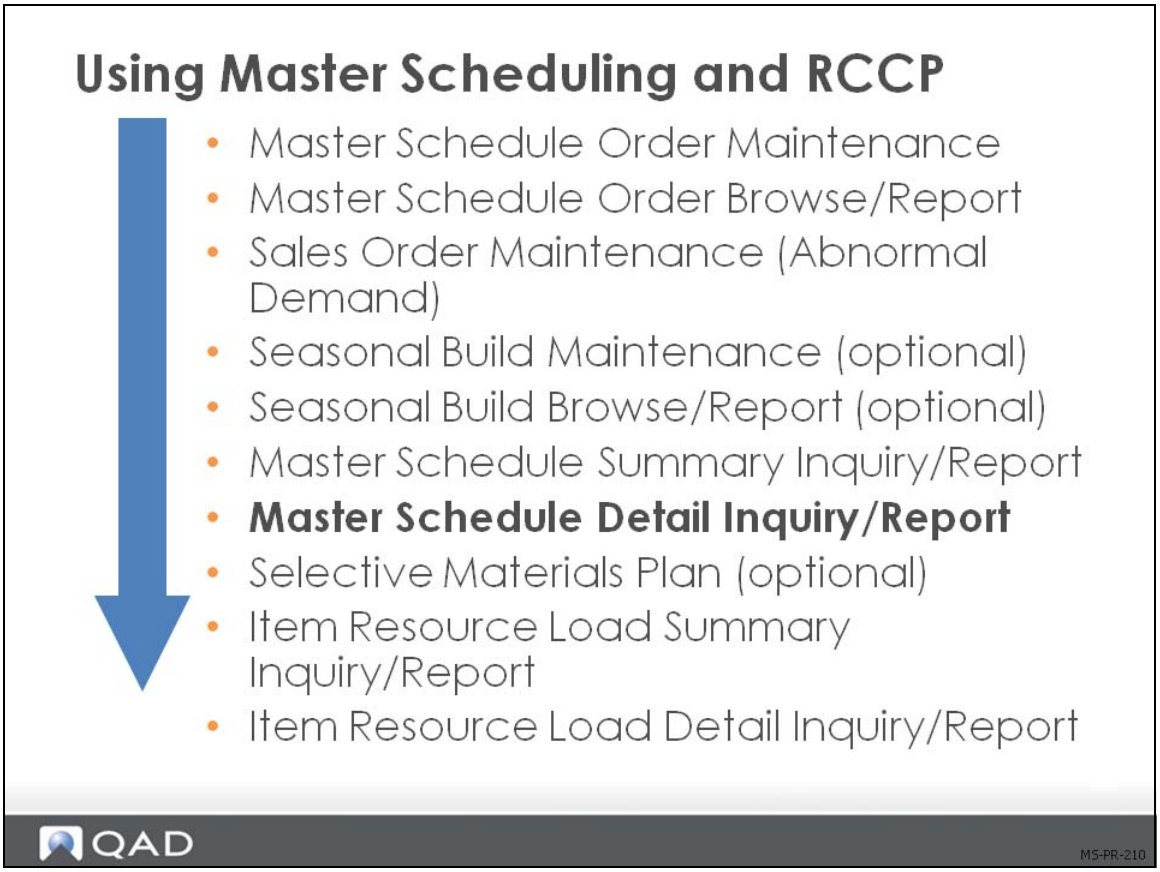
While the data displayed on the MPS summary report (shown above) is the same as the MPS summary inquiry (previous page). The selection screen offers considerably more flexibility than the inquiry.

Master Schedule Summary Report

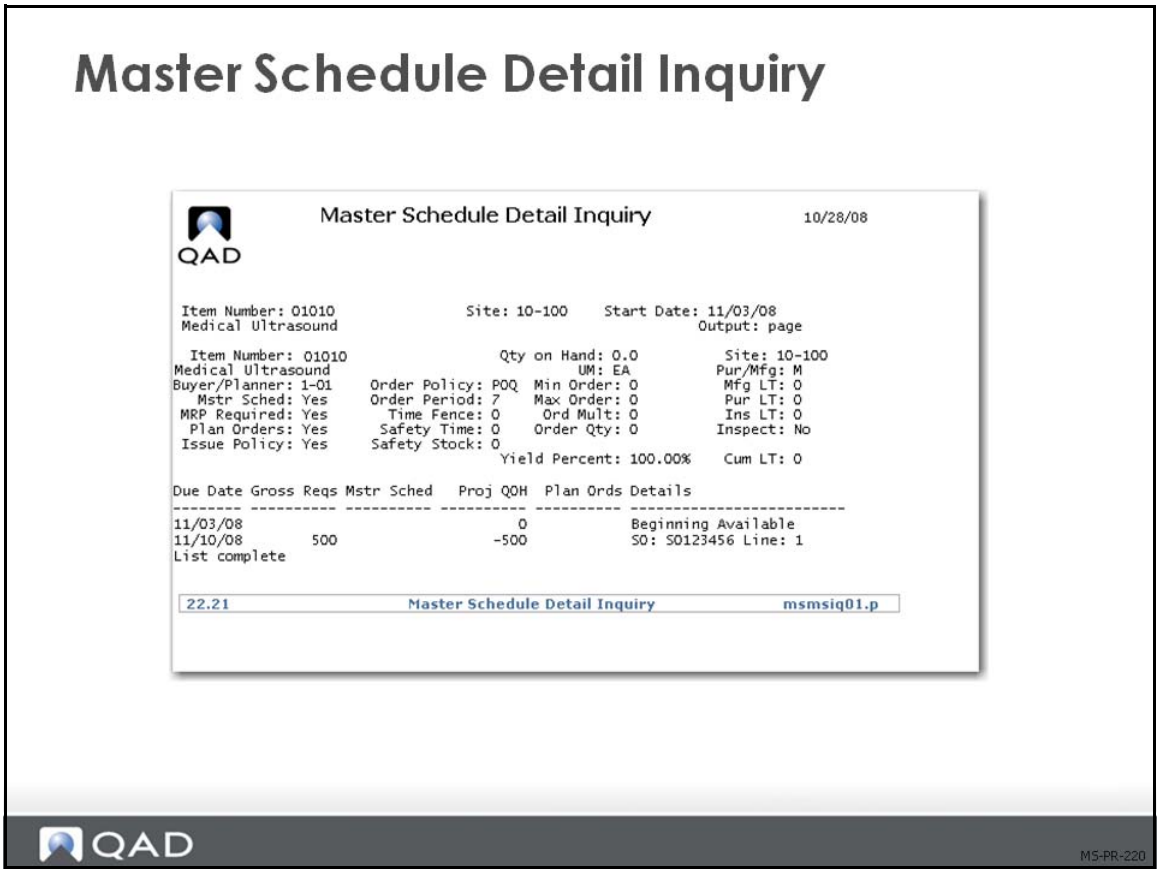


The report allows a broad range of selection criteria. Whether printed to paper or viewed on the terminal, this report gives the master scheduler a powerful tool for reviewing the schedule.

Master Schedule Detail Inquiry/Report



Master Schedule Detail Inquiry



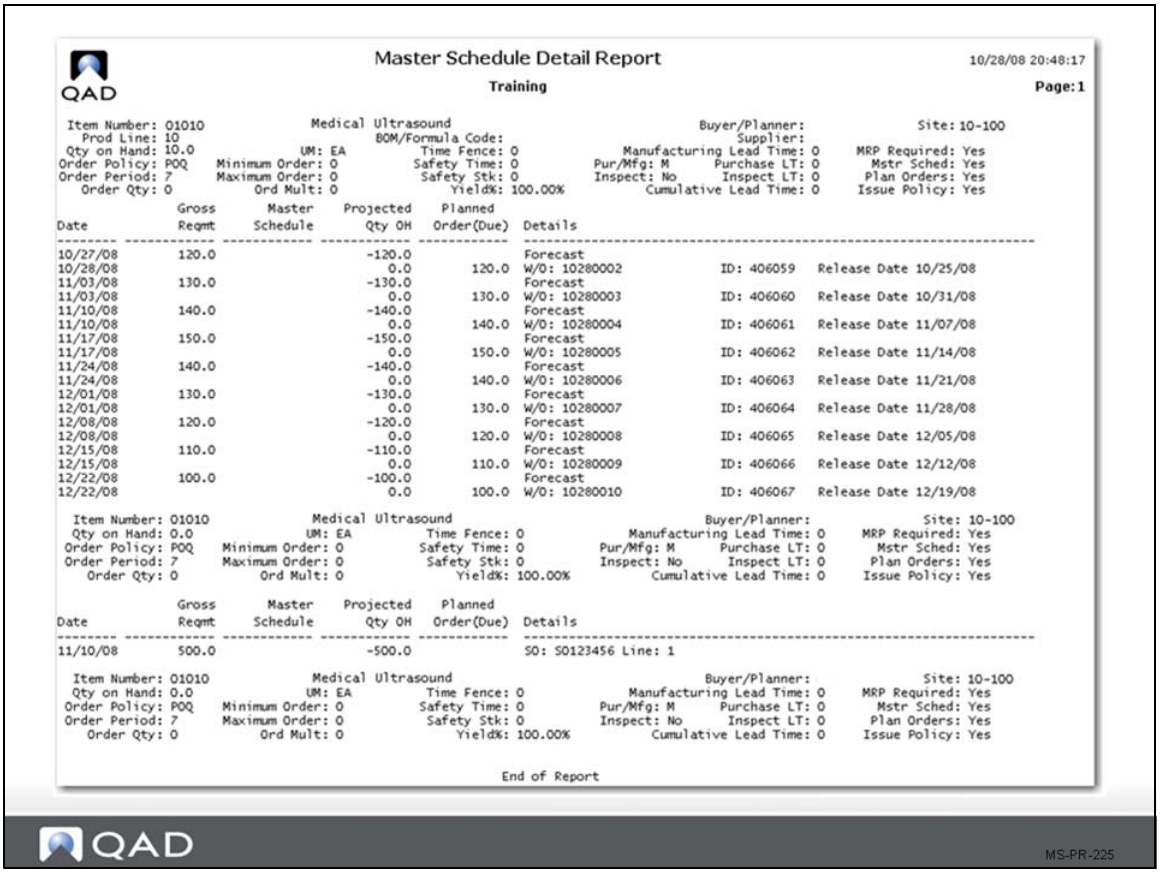
The Master Schedule Detail Inquiry displays:

- A date-sequenced description of each demand and supply record
- Item/site planning data followed by a time-phased replenishment display in due date sequence

The screen shows the same information as the Master Schedule Summary Inquiry, including the pegging of demands to their source. For example, the actual work order or sales order that generated the requirement is identified.

Note One-level pegging is available in QAD Enterprise Applications

Master Schedule Detail Report



Master Schedule Detail Report

10/28/08 20:48:17

Training

Page:1

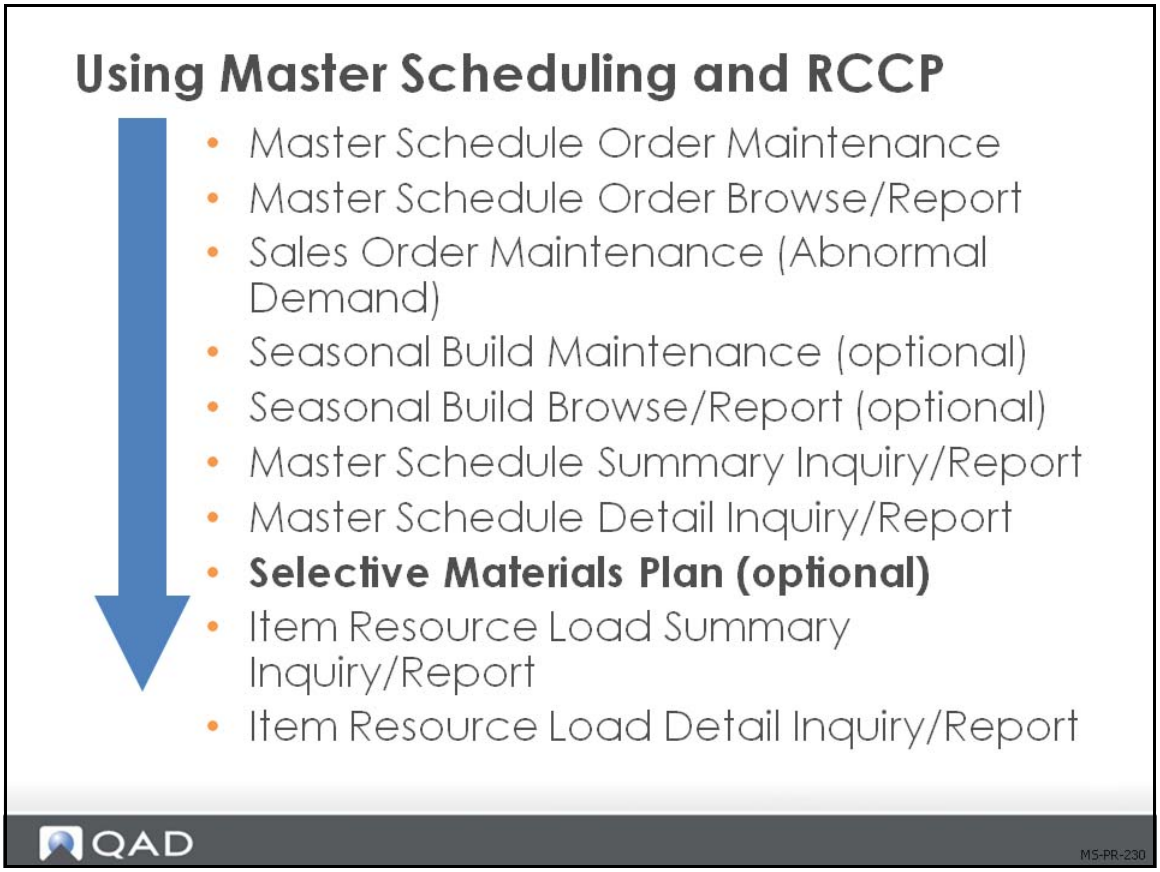
```
Item Number: 01010              Medical Ultrasound                          Buyer/Planner:              Site: 10-100
  Prod Line: 10                                                             Supplier:
Qty on Hand: 10.0                    UM: EA          Time Fence: 0          Manufacturing Lead Time: 0    MRP Required: Yes
Order Policy: POQ    Minimum Order: 0                Safety Time: 0         Pur/Mfg: M      Purchase LT: 0     Mstr Sched: Yes
Order Period: 7      Maximum Order: 0                Safety Stk: 0          Inspect: No     Inspect LT: 0      Plan Orders: Yes
   Order Qty: 0           Ord Mult: 0                    Yield%: 100.00%                 Cumulative Lead Time: 0    Issue Policy: Yes

                Gross       Master     Projected    Planned
Date            Reqmt       Schedule     Qty OH   Order(Due)  Details
--------  ------------  ------------  ----------  ----------  --------------------------------------------------------------------------
10/27/08         120.0                     -120.0              Forecast
10/28/08                                      0.0       120.0  W/O: 10280002             ID: 406059   Release Date 10/25/08
11/03/08         130.0                     -130.0              Forecast
11/03/08                                      0.0       130.0  W/O: 10280003             ID: 406060   Release Date 10/31/08
11/10/08         140.0                     -140.0              Forecast
11/10/08                                      0.0       140.0  W/O: 10280004             ID: 406061   Release Date 11/07/08
11/17/08         150.0                     -150.0              Forecast
11/17/08                                      0.0       150.0  W/O: 10280005             ID: 406062   Release Date 11/14/08
11/24/08         140.0                     -140.0              Forecast
11/24/08                                      0.0       140.0  W/O: 10280006             ID: 406063   Release Date 11/21/08
12/01/08         130.0                     -130.0              Forecast
12/01/08                                      0.0       130.0  W/O: 10280007             ID: 406064   Release Date 11/28/08
12/08/08         120.0                     -120.0              Forecast
12/08/08                                      0.0       120.0  W/O: 10280008             ID: 406065   Release Date 12/05/08
12/15/08         110.0                     -110.0              Forecast
12/15/08                                      0.0       110.0  W/O: 10280009             ID: 406066   Release Date 12/12/08
12/22/08         100.0                     -100.0              Forecast
12/22/08                                      0.0       100.0  W/O: 10280010             ID: 406067   Release Date 12/19/08

Item Number: 01010              Medical Ultrasound                          Buyer/Planner:              Site: 10-100
Qty on Hand: 0.0                     UM: EA          Time Fence: 0          Manufacturing Lead Time: 0    MRP Required: Yes
Order Policy: POQ    Minimum Order: 0                Safety Time: 0         Pur/Mfg: M      Purchase LT: 0     Mstr Sched: Yes
Order Period: 7      Maximum Order: 0                Safety Stk: 0          Inspect: No     Inspect LT: 0      Plan Orders: Yes
   Order Qty: 0           Ord Mult: 0                    Yield%: 100.00%                 Cumulative Lead Time: 0    Issue Policy: Yes

                Gross       Master     Projected    Planned
Date            Reqmt       Schedule     Qty OH   Order(Due)  Details
--------  ------------  ------------  ----------  ----------  --------------------------------------------------------------------------
11/10/08         500.0                     -500.0              SO: SO123456 Line: 1

Item Number: 01010              Medical Ultrasound                          Buyer/Planner:              Site: 10-100
Qty on Hand: 0.0                     UM: EA          Time Fence: 0          Manufacturing Lead Time: 0    MRP Required: Yes
Order Policy: POQ    Minimum Order: 0                Safety Time: 0         Pur/Mfg: M      Purchase LT: 0     Mstr Sched: Yes
Order Period: 7      Maximum Order: 0                Safety Stk: 0          Inspect: No     Inspect LT: 0      Plan Orders: Yes
   Order Qty: 0           Ord Mult: 0                    Yield%: 100.00%                 Cumulative Lead Time: 0    Issue Policy: Yes


                                                End of Report
```

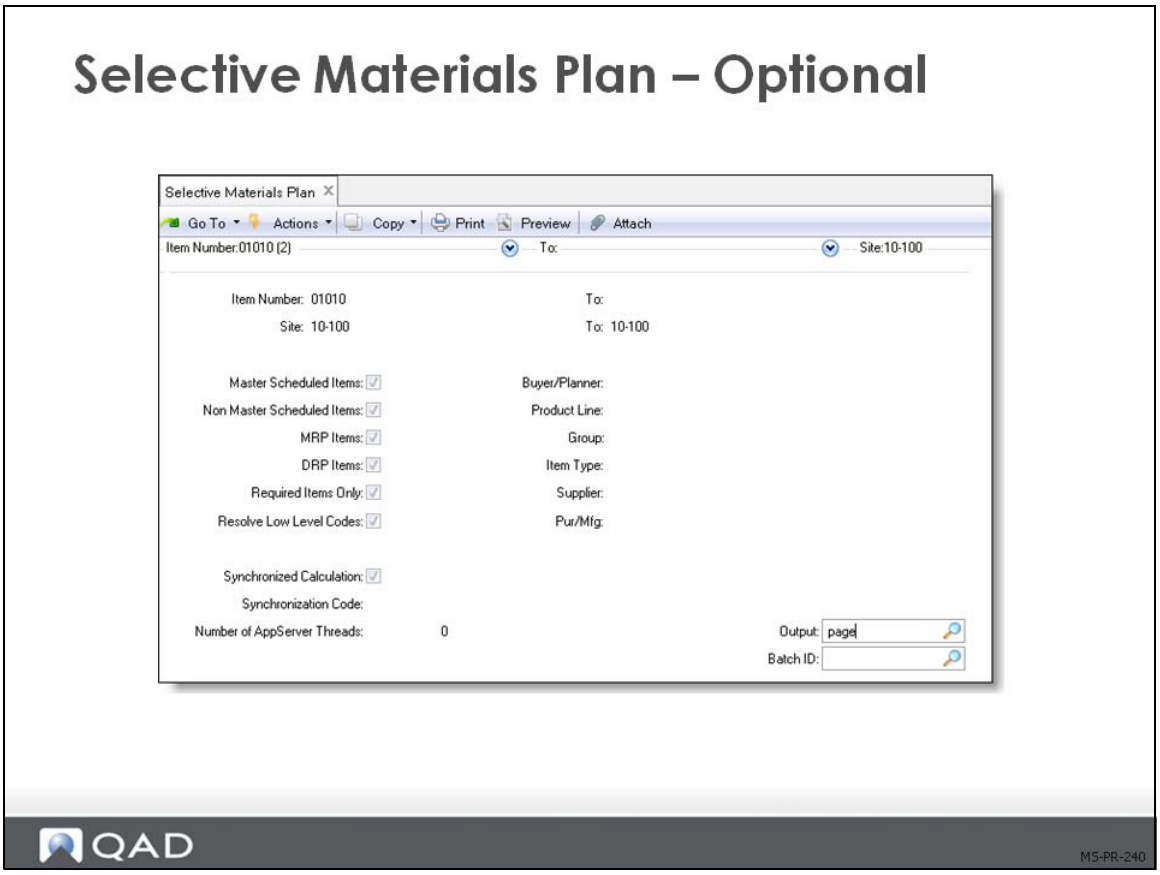
QAD

MS-PR-225

Provides a printed copy of the information displayed in Master Schedule Detail Inquiry (22.21). While the data displayed are the same the selection criteria offered by the report is significantly enhanced over the inquiry.

Selective Materials Plan





Selective Materials Plan (23.3) lets you plan master scheduled items separately from MRP items. If you use the computer-assisted approach to master scheduling, you may want to run Selective Materials Plan as follows:

- Run Selective Materials Plan for master scheduled items only
- Adjust the master schedule and rerun Selective Materials Plan as needed
- Run Selective Materials Plan for MRP-scheduled items only

MRP provides time-phased balancing of: supply and demand for purchased and manufactured items. It uses the master schedule and all other sources of demand and supply to:

- Calculate gross requirements and projected on-hand inventory
- Schedule and plan orders
- Produce action messages for managing the materials plan

Selective MRP runs as Net Change (MRP Required = Yes) or as Regenerative (MRP Required is No). It plans only the items selected, passing down gross requirements to the next unselected level, but not replanning orders. Net Change Materials Plan (23.1) and Regenerate Materials Plan (23.2) items are based on low-level code, generating requirements at the top level first, then down through the structure one level at a time

Selection can be based on:

- Item Number
- Site

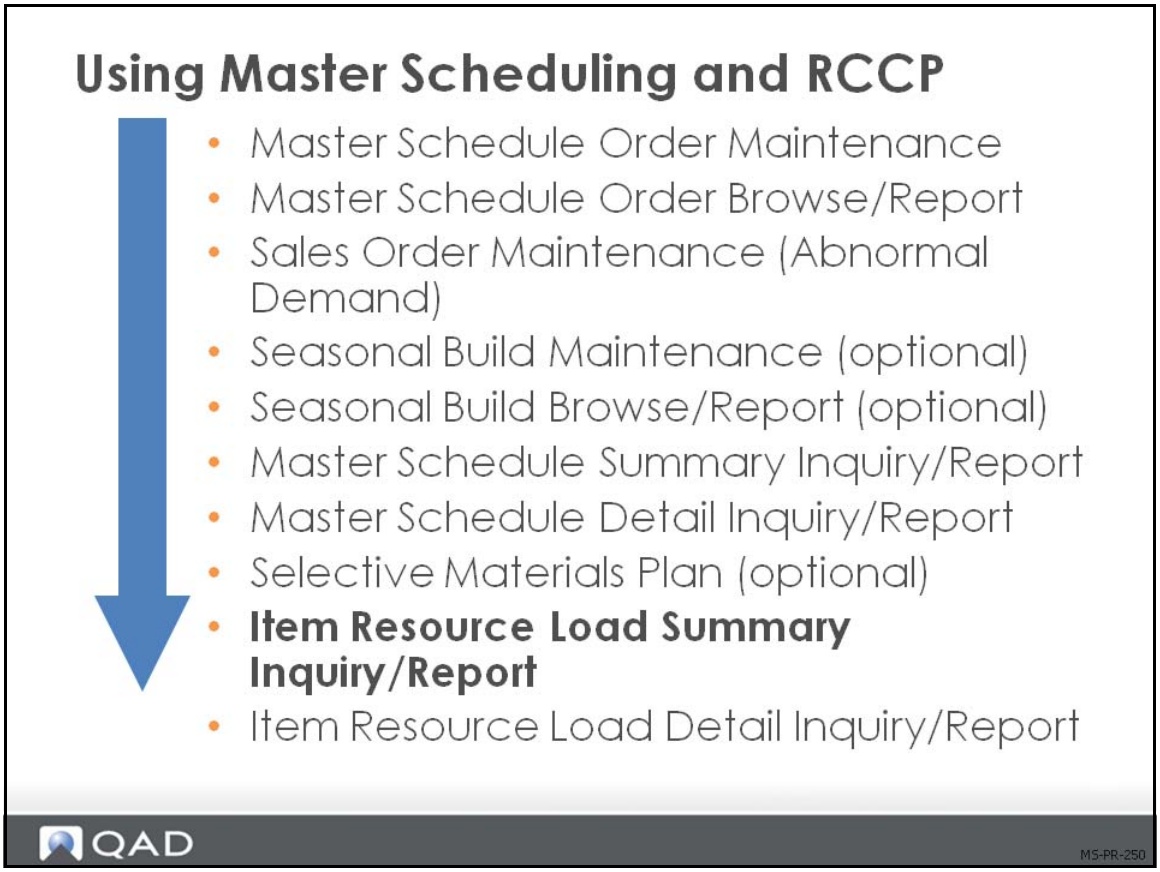
- Buyer/Planner
- Prod Line
- Group
- Item Type
- Supplier
- Pur/Mfg

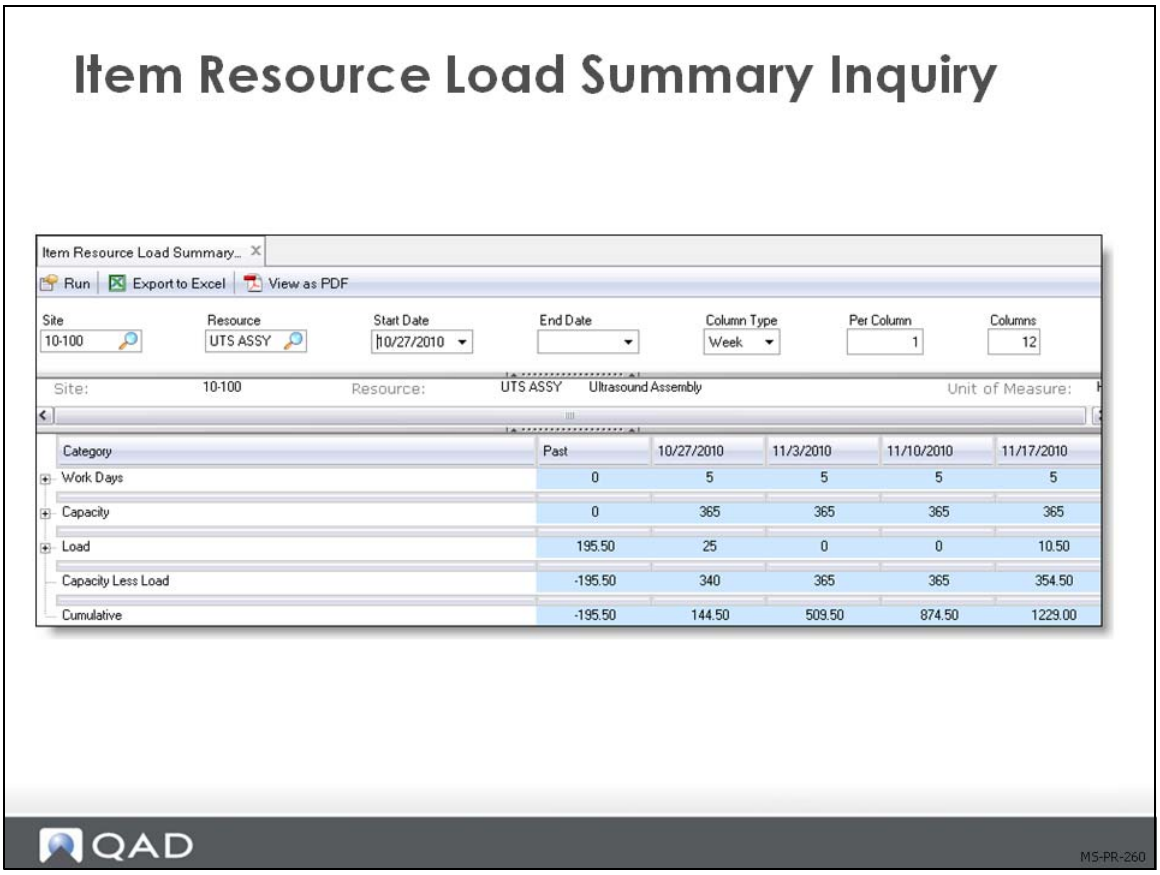
One or both of the Master Scheduled Items or Non Master Scheduled Items fields must be Yes. The same is true of the MRP Items and DRP Items fields.

Replanning Master Scheduled Items

When master scheduled items are selected, orders are planned for parent items and gross requirements are passed down to the next-level components and will not be replanned. No orders are planned for the components.

Item Resource Load Summary Inquiry/Report





Calculating Load

Item Resource Load Inquiries (21.21) and Reports (21.22) can be run after the:

- Resource has been entered
- Conversion factor and lead times have been set up

QAD Enterprise Applications calculates the load automatically using the scheduled end-item quantities and the Resource Qty Per entered in Item Resource Bill Maintenance (21.17).

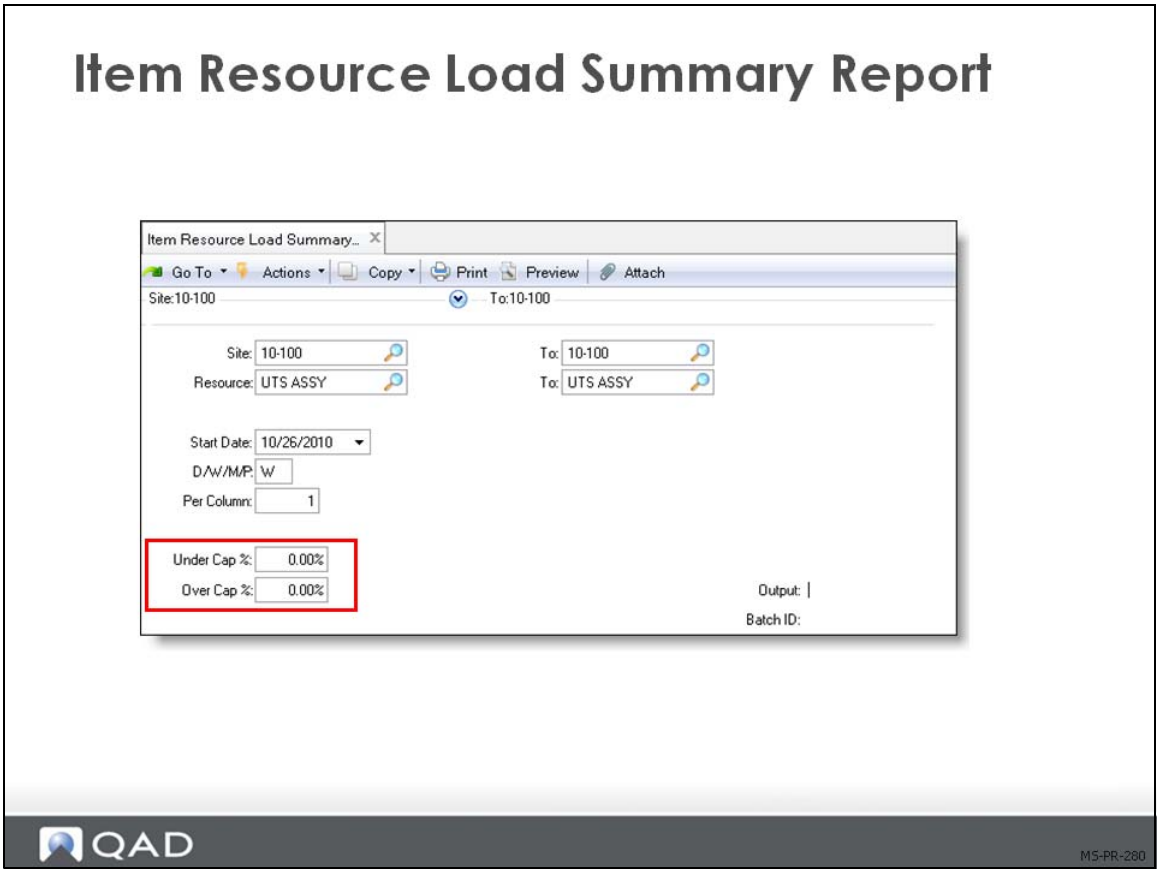
The Item Resource Load Summary displays the:

- Resource capacity
- Required resource capacity (production load) to meet scheduled production
  - In daily, weekly, or monthly buckets
- The load is subtracted from capacity
  - Over-capacity appears as a negative number in the Over/Under row
  - Under-capacity appears as a positive number

Cumulative Over/Under Load

The cumulative column displays the Over/Under quantity added to any over- or under-capacity from past planning periods.

Item Resource Load Summary Report



While the Item Resource Load Summary Report (21.22) shows the same information as Item Resource Load Summary Inquiry (21.21) it does allow selection based on a range of over/under percentage. This can be useful to filter out very small over/under loads to focus on the serious capacity issues.

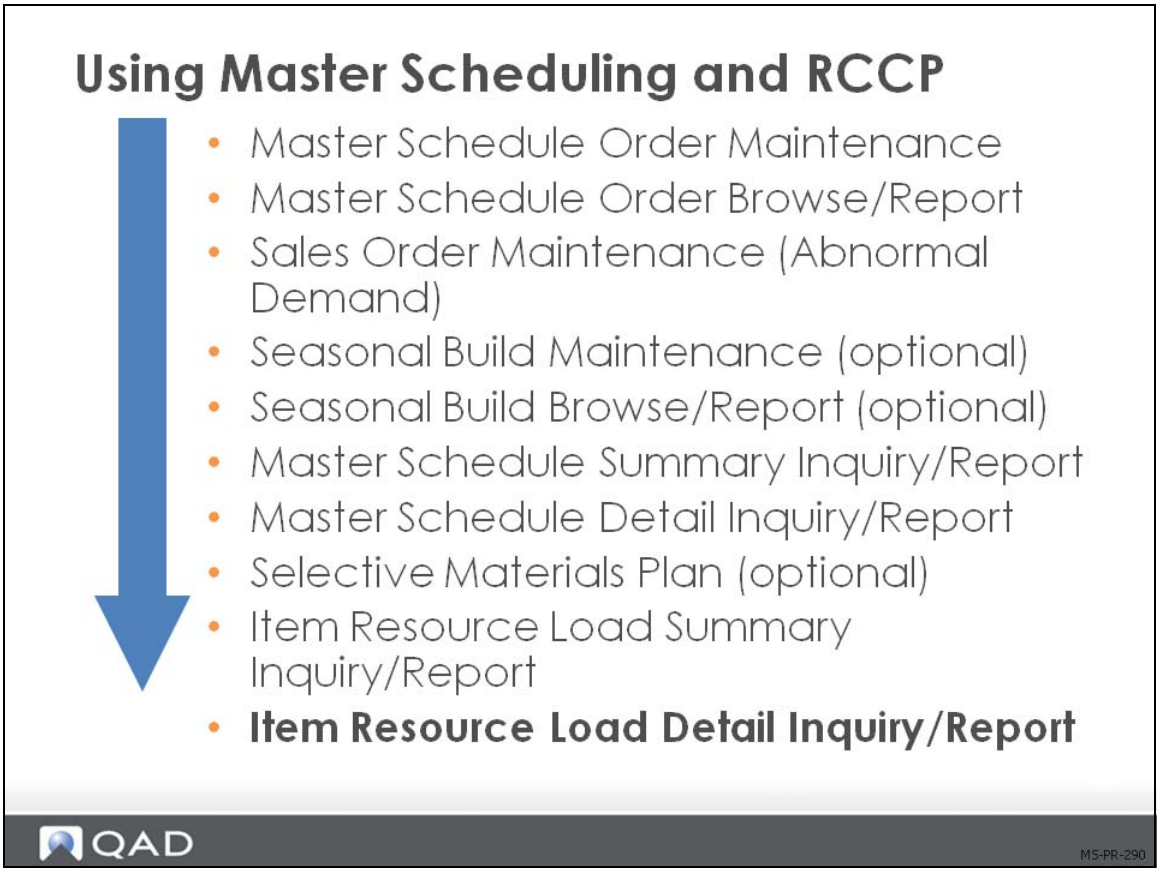
For each resource, you can define resource bills (load profiles) that specify the amount of the resource required to manufacture a product line or item.

Resource planning:

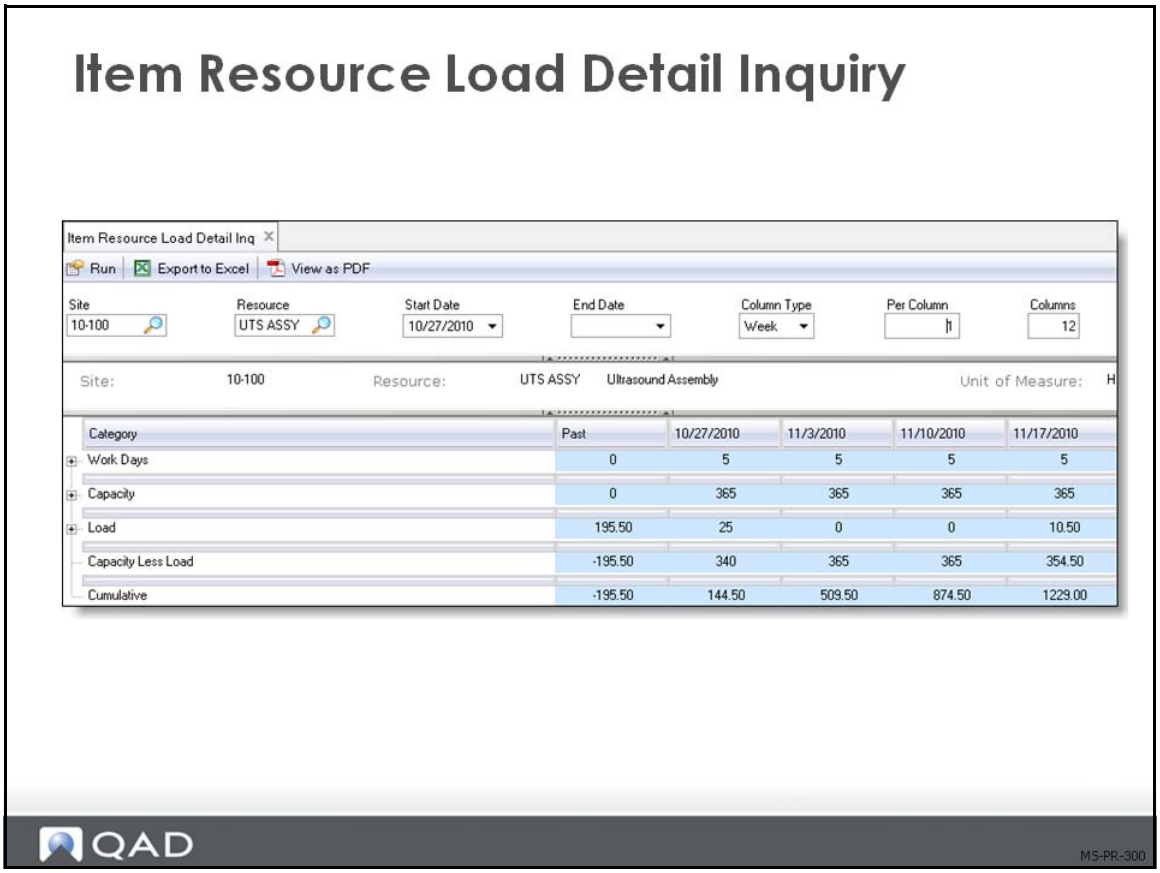
- Evaluates the feasibility of production plans and master schedules
- Identifies where adjustments are required

If the production plan needs more machine capacity, decrease production or increase machines.Catching the imbalance at this level allows adjustment of the plan before work is scheduled or customer promises are made.

Item Resource Load Detail Inquiry/Report

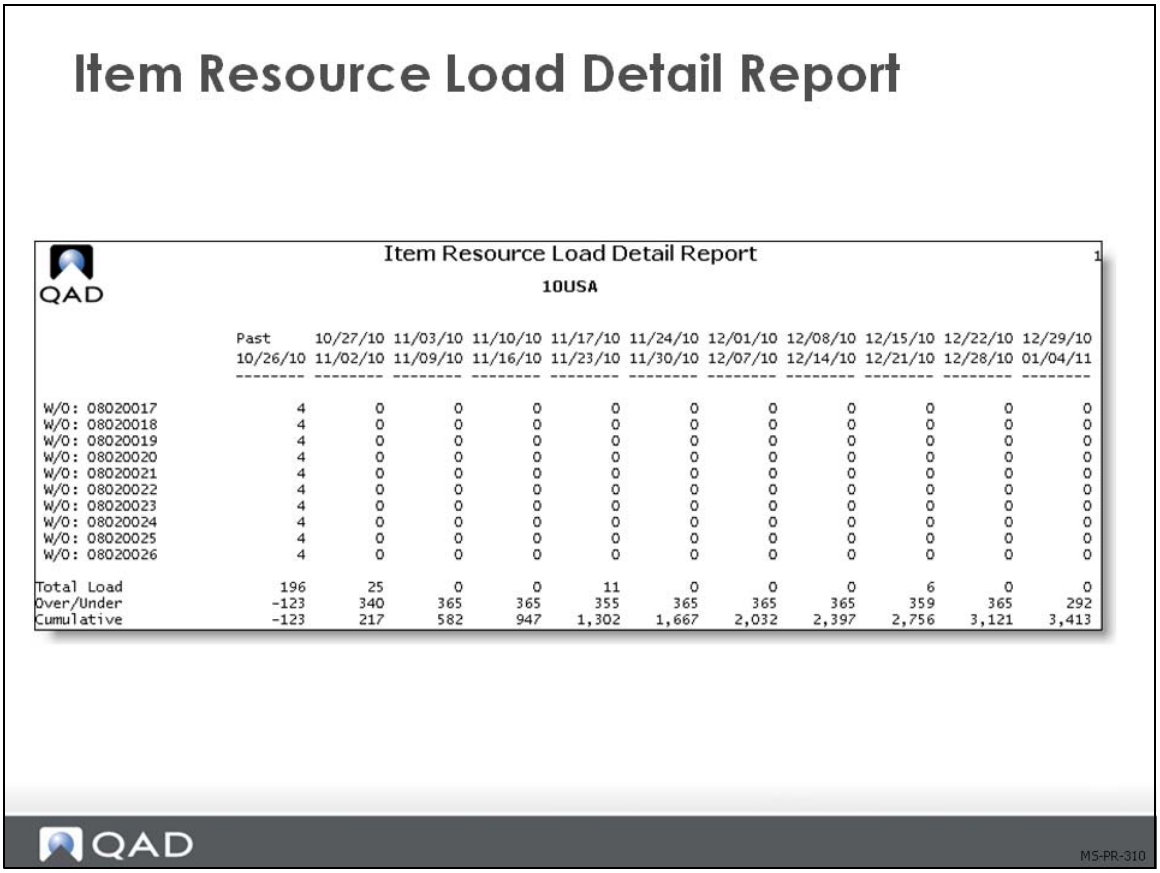


Item Resource Load Detail Inquiry



The item resource load detail inquiry and report show the detail of the orders that are creating the load. This example shows the work orders and items that are the specific labor load for this site. Once the summary has shown an overload condition exists, the master scheduler makes decisions about whether to schedule overtime, add extra shifts or reschedule the work orders. The detail reports will show the actual orders that may need to be rescheduled.

Item Resource Load Detail Report



While the data displayed are the same for the inquiry and report, some schedulers will prefer the format of the report, which can be viewed on the monitor or printed.

Note In Enterprise Edition, an enhanced .NET UI-only version of Item Resource Load Detail Report is available on menu 21.48.

Exercise: Processing

Review a Seasonal Build Forecast

This exercise covers entering and reviewing a forecast and a seasonal build plan.

1. Item 01042 at site 10-100 is being introduced into a new marketplace 4 weeks from next Monday.
2. As a hedge against sales being greater than anticipated, you would like to have an additional 60 units in stock available on the date of the introduction. These will be produced in the two weeks prior to the introduction.

   Use Seasonal Build Maintenance (22.9) to enter a seasonal build schedule using Monday dates.

Field	First Entry	Second Entry	Third Entry
Site	10-100	10-100	10-100
Item Number	01042	01042	01042
Date	[2 wks prior]	[1 wk prior]	[Intro Date]
Reference	Intro	Intro	Intro
Seasonal Inventory	30.0	60.0	0.0

3. Run a Seasonal Build Browse for item 01042 to ensure that the data has been entered correctly.
4. Run Selective Materials Plan (23.3) for item 01042.
5. Review the Master Schedule Summary Inquiry (22.18) and Master Schedule Detail Inquiry (22.21) to review the impact of the seasonal build.

Rough-Cut Capacity Planning

In this exercise, you will level a load using the rough-cut capacity planning (RCCP) process. The exercise includes creating master scheduled orders, running selective MRP, reviewing inquiries and reports, and increasing capacity to balance the load. Use item 01041, site 10-100 throughout the exercise.

1. Use Master Schedule Order Maintenance (22.13) to create a work order.

Field	Data
Work Order	[blank]
ID	[blank]
Item Number	01041
Type	[blank]
Site	10-100
Qty Ordered	100
Order Date	[Today’s Date]
Release Date	[Two weeks from today]
Due Date	[Three weeks from today]

2. Run Selective Materials Plan (23.3) for item 01041 at site 10-100.

3 Use Item Resource Bill Maintenance (21.17) to create an item resource bill for item 01041:

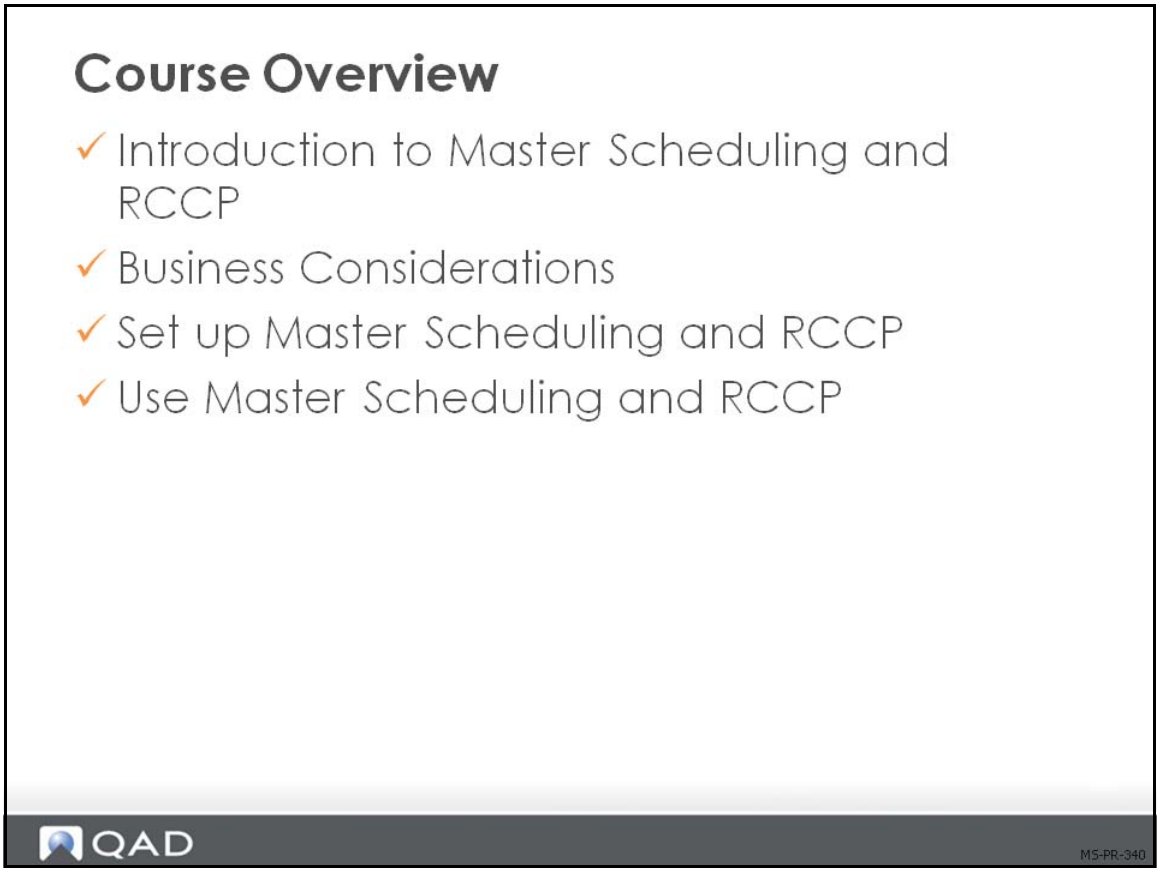
Field	Data
Site:	10-100
Resource:	Labor
Start Date:	[blank]
End Date:	[blank]
Resource Qty. Per:	4
Lead Time:	1

4 Use Item Resource Load Summary Inquiry (21.21) to review the resource load for site 10-100, resource Labor. Is there enough capacity to do the plan?

5 Using Resource Maintenance (21.1), increase labor capacity for site 10-100. How much do you need to increase the daily labor supply?

6 Use Item Resource Load Summary Inquiry (21.21) and Item Resource Load Detail Inquiry (21.23) to review the effects of your changes.

Course Summary



Appendix A

Workshops and Study Questions

Master Schedule Setup

1 Explain what fields must be set to have forecast consumption occur.

2 In QAD Enterprise Applications, to allow shipment of seasonal build requirements, what entry must be entered on the Seasonal Build Maintenance screen?

3 What fields in Item-Site Planning Maintenance are used to designate a master schedule item?

4 A forecast is considered to be a dependent demand requirement.

True/False

5 Abnormal demand is the preferred method of building to inventory.

True/False

6 A Plan Orders field setting of No constitutes the fully manual approach to master scheduling.

True/False

7 A time fence is the longest period of time it takes to either purchase or manufacture an item, assuming nothing is on hand.

True/False

8 Available-to-promise (ATP) is a manually entered value in QAD Enterprise Applications.

True/False

9 Dependent demand items can be shipped on a sales order.

True/False

10 In any time period, the ATP quantity can never be less than the projected on-hand quantity.

True/False

RCCP

1 List four of the key resources for scheduled end items in your company's plants.

a

b

c

d

2 If the Item Resource Summary shows 150% load in each of the next four weeks, what do you need to do?

3 The item resource plan does not take into account component production demands.

TrueFalse

4 A resource plan that appears slightly over or under capacity is typically ignored.

TrueFalse

5 Item resource loads are calculated from _____.

6 Overtime is scheduled by entering a Reference and a positive number of hours in Item Resource Bill Maintenance.

TrueFalse

7 Rough-cut capacity planning only looks at firm planned work orders and repetitive schedules.

TrueFalse

8 A negative lead time offset in the Item Resource Bill Maintenance indicates that the resource is needed before/after production begins.

BeforeAfter

Answers to Master Schedule Setup Study Questions

1 Set Consume Forecast = Yes on the sales order and enter a positive value in Consume Fwd and/or Consume Back in Sales Order Control.

2 A quantity smaller than the previous seasonal build entry must be entered. To release the entire seasonal build quantity, enter a zero.

3 In fact, an item is a master schedule item if the planner says it is. The planner determines whether it should be selected during a selective MRP based on Master Schedule = Yes or No. The planner also decides whether the system should create planned orders.

   Set the following fields: Master Sched = Yes, Plan Orders = No. The key is the Plan Orders setting, which tells MRP whether to plan the item or not. You can set Plan Orders = Yes, and then use a Time Fence value to control the creation of orders within the near term horizon.

4 False. Forecasts and sales orders are independent demand requirements.

5 False. Seasonal build is the accepted method of building to inventory.

6 True.

7 False. A time fence is a period of calendar days from the system date for which MRP will not create planned orders.

8 False. ATP is calculated by the system and appears on the Master Schedule Summary Inquiry screen.

9 True.

10 False. If ATP is negative, it is over-promised for the remaining planning horizon.

Answers to RCCP Study Questions

2 Reduce production by 50% or increase capacity by 50%.

3 True. The Capacity Requirements Plan performs this task.

4 True. Slight deviations can usually be worked out on the shop floor.

5

a The production forecast from the Product Line Plan.

b The master schedule for the items.

6 False. Use Resource Maintenance.

7 False. It includes released, firm planned, exploded, and allocated orders.

8 After.

Appendix B

Reports, Inquiries, Browses

Master Scheduling and RCCP Reports, Inquiries, Browses

Report, Inquiry, Browse	Function/Purpose
Forecast Inquiry	Displays forecasts for any item or product subject to independent demand. Forecasts may also be displayed for spares requirement, planning items and configured products.
Forecast Report	Provides a means of printing the information displayed in Forecast Inquiry.
Seasonal Build Inquiry	Displays seasonal build forecasts, which are usually derived from a product line plan, then used to develop the operations plan and the master production schedule. They are then periodically adjusted based on actual results or changes in the business plan.
Seasonal Build Report	Provides a means of printing the information displayed in Seasonal Build Inquiry.
Master Schedule Order Inquiry	Displays information about master schedule orders that determines how items will be made (routing), and what components will be used (BOM).
Master Schedule Order Report	Provides a means of printing the information displayed in Master Schedule Order Inquiry.
Master Schedule Summary Inquiry	Displays vital information derived from the production forecast, sales orders, gross requirements, master scheduled receipts, projected quantities on hand. Projection by period of the on-hand balance plus incoming orders minus the requirements
Master Schedule Summary Report	Provides a means of printing the information displayed in Master Schedule Summary Inquiry.
Master Schedule Detail Inquiry	The Master Schedule Detail Inquiry and Report functions 22.21 and 22.22 display the same information as the Master Schedule Summary Inquiry and Report, sequenced by due date. They also include source-to-demand pegging details, allowing you to identify the actual work order or sales order generating a particular item requirement.
Master Schedule Detail Report	Provides a means of printing the information displayed in Master Schedule Detail Inquiry.
Item Resource Bill Inquiry	Displays information on resource requirements for individual items.
Item Resource Bill Report	Provides a means of printing the information displayed in Item Resource Bill Inquiry
Item Resource Load Summary Inquiry	Displays the required resource capacity (production load) to meet scheduled production in daily, weekly, or monthly buckets. The load is subtracted from capacity: over-capacity appears as a negative number in the Over/Under row, under-capacity appears as a positive number.
Item Resource Load Summary Report	Provides a means of printing the information displayed in Item Resource Load Summary Inquiry.
Item Resource Load Detail Inquiry	Displays detailed information about the required resource capacity.
Item Resource Load Detail Report	Provides a means of printing the information displayed in Item Resource Load Detail Inquiry. Enterprise Edition includes an additional enhanced version of the report for .NET UI users.

Product Information Resources

QAD offers a number of online resources to help you get more information about using QAD products.

QAD Forums (community.qad.com)
Ask questions and share information with other members of the user community, including QAD experts.

QAD Knowledgebase (knowledgebase.qad.com)*
Search for answers, tips, or solutions related to any QAD product or topic.

QAD Document Library (www.qad.com/documentlibrary)
Get browser-based access to user guides, release notes, training guides, and so on; use powerful search features to find the document you want, then read online, or download and print PDF.

QAD Learning Center (learning.qad.com)*
Visit QAD's one-stop destination for all courses and training materials.

*Log-in required